POPULAR Computing WEEKLY

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This Week

Spectrum adventures

John Scriven looks at a selection of adventure games for the Spectrum and samples the delights of becoming a football manager. See page 12

Dragon clear

M Twigger presents a short machine code, routine for fast, partial screen clearance on the Dragon 32. See page 33

Softsynch

David Kelly talks to Sue Currier, president of US software house, Softsynch, about the micro market in America on page 11

Adventure corner

Tony Bridge looks at Ghost Encounters and Action Quest for the Atari. See page 27

STAR GAME

King Cedrick on Vic20 by Gwyn Jones. See paga 8.

News Desk

Microdrive nearing completion

DESIGN of the Sinclair Microdrive has now been "frozen" according to Nigel Searle, managing director of the company's computer division.

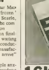
"The design has been finalised and we are now waiting for custom-made semiconductor chips — being manufactured in the UK — to arrive" he said last week.

However those people anxiously awaiting the Microdrive will have to be patient awhile longer. The chips will be rigorously tested, and suitable stocks built up, before Sinclair goes into production.

When the Microdrive is finally released, it will be offered initially in batches to the first 100,000 customers who bought Spectrums mail-order — those customers who bought their Spectrums in April last year will be at the head of the queue.

With most of the technical details sorted out, the Microdrive's price has been fixed at

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16K Oric — doubts over future

THE future of the 16K Oric 1 microcomputer is in doubt.

The problem is that the 16K machine — developed jointly by Tangerine and Oric Products International — was originally intended for mail-order sale. From the beginning of March, Oric is only selling the 16K machine through retail shops, though Tangerine will continue to sell it mail-order. But many stores feel that the discounts being offered to them are not enough to justify taking the product.

W H Smiths, for example, will only be stocking the 48K model in its stores from April.

"At the moment it is costing so much to build the 16K that we cannot give a decent discount," confirmed Tangerine's Paul Kaufman. "Later on in the year production costs may come down and we will be able to offer a better deal."

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This Week

Editorial

The announcement this week that Psion has sold 1m cassettes, provides a good indication of the current size of the software market And it is growing all the time

People who spend anywhere between £50 and £200 on buying a micro, are spending at least as much again on buying software Fortunes are being made with almost indecent haste, if not overnight

Many of the successful companies, such as Artic, Quicksilva and Imagine, have tended to be made up of small, enthusiastic, groups of young people However, a few companies, like Psion and Melbourne House, have been organised along the lines of a university research team Teams of programmers, working under a project head, have combined to produce ambitious games and utilities such as *The Hobbit* and *Vu3D*

This difference in approach has resulted in a wide variety of programs coming on to the market But the software industry is rapidly becoming more competitive, with bigger companies, such as Virgin Games, entering the field

Whether or not these latecomers make the same impact as their predecessors remains to be seen One thing is certain, however — it is going to become increasingly difficult for individual programmers to start-up their own companies

Next Thursday

Will you get out of the PoW camp alive? Can you dodge the machine guns and searchlights? Find out next week in Escape, a new game for the 16K Spectrum by John Durst.

Oric doubt

Continued from page 1

Few 16K machines are being manufactured at present Some mail-order customers who have ordered the 16K version, have been sent 48K models These will be exchanged later when the 16K machines become available, or the customers will pay the difference and keep the more expensive version

"Full production of the 16K hasn't started and sending out the 48K machines gets round the 28-day delivery problem," said Paul

However, with high street stores unwilling to take the smaller memory version, it is not certain that the 16K machine will ever be produced in quantity

"The testing procedures are easier on the 48K machine," said Paul "We have to build the 16Ks as 48K machines and then take out some of the chips "

At the same time, Oric is trying to solve problems experienced with the colour display of both machines

"We have changed the modulator and some of the associated components and added a new control which affects the firmness of the picture on the screen," said Paul An additional hole is being drilled in the underneath of the casings to give the customer access to this modulator adjustment

All the machines so far sent out use Eproms rather than Roms "There are still a few buglets in the software — in the *Tab* and *Fill* commands for example — which we are correcting as we go along When that is done we will be going for Rom but things are in a state of flux at the moment," added Paul

More micros

W H SMITH is to expand the range of home computers carried in its stores

From April onwards its high street stores will sell the Commodore 64 machine The company has placed an initial order for 500 of the machines

Also in April W H Smith will begin to sell a range of software for the BBC machine The chain will also sell the Oric 1 (48K) computer — 12 000 have been ordered fewer than previously announced

Psion sells 1m tapes in software boom

PSION, the ZX81 and Spectrum software house, has reached record-breaking heights with the sale of its millionth cassette

The company has a unique relationship with Sinclair Research Under a far reaching agreement between the two companies, finalised in June last year, Sinclair Research exclusively markets ZX material produced by the London-based Psion

Having first established a range of successful ZX81 titles Psion went on to produce the *Horizons* welcome tape for the ZX Spectrum — on the suggestion of Sinclair Research Since the Spectrum went on sale, almost a year ago, Psion has built up a range of software including *Flight Simulation*, the *Vu* utility programs series and the *Hungry Horace* games programs — this latter produced in association with Melbourne House

Psion, formed only two and a half years ago, now has an annual turn-over in excess of £5m

"*Flight Simulation* is our best seller but the utility packs — *Vu-3D* and *Vu File* — sell very well *Vu-File* is our second best-selling tape — in the US it is the No 1 TS1000 program," commented Psion managing director, David Potter

Psion MD David Potter

Timex investigation

PRIME Minister Margaret Thatcher has leant her weight behind an investigation of Timex's plans to axe 1900 jobs in Dundee

The redundancies put at risk the future of Sinclair computer manufacture in the UK

Mrs Thatcher has endorsed an investigation by the European Commission of grants being offered to Timex to set up a production facility in France The French Government's £52m grants offer may constitute a breach of EEC rules

Sinclair Research's new headquarters in Cambridge The design, by architects Lyster Grillet and Harding, involved extensive modernisation of the original building – a former bottling factory

Corby site chosen as Commodore base

COMMODORE has selected Corby as its UK manufacturing base

The decision had been predicted for some time and has now been given the go-ahead after receiving a substantial Department of Industry Development Grant — estimated to be in the region of £2m

The £20m plant will produce the Vic20 and Commodore 64 machines — production transferred from the company's existing factory at Braunchweig, West Germany This will leave the German plant free to manufacture the 500 and 700 series business machines

The Corby plant has been planned for some time "We actively began to pursue this proposal last November," said a Commodore spokesman

"It was the success of the Vic20 and forward orders for the 64 that gave us the confidence to carry it through At the moment demand is exceeding production and a move such as this was clearly needed "

The first Vic20 to come off the British production line will arrive in June and Commodore is hoping to step up production by late 1984 to over 500 000 units per year

The Corby plant is expected to employ over 300 people and will supply Commodore's home computers to the whole of Europe

Salamandar daal

SALAMANDER Software has concluded a deal with Jeff Minter of Llamasoft to produce versions of his Vic20 software on other machines

To begin with, Salamander will be converting the *Grid Runner* program for the Dragon, Spectrum and BBC

Bristol show

THE Bristol Hobbyist Microfair will be held on Saturday, March 19, in the Horfield TA Centre, Horfield Common, Bristol With over 30 stands, the show will be open from 10 30 am to 5 30 pm, entry £1

More details from Dave Rees on Bristol 519912

Microdrive

Continued from page 1

£40 This is £10 less than previously announced, but it will still have to be connected to the computer via the £30 RS232 network interface board

According to Searle, the cost of the interchangeable storage medium will be about the same as a 5¼inch floppy disc — around £2-3 Each of these storage devices will have a capacity in excess of 100K and the hoped-for access time is now suggested to be faster than 3 5 seconds

Royal complaints

Tim Langdell's letter (*Popular Computing Weekly*, March 3-9) was very thought-provoking! None of the many companies selling compilers for main-frame (and mini) computers charge royalties on programs produced using their compilers.

Tim Langdell's main justification for insisting on such royalties seems to be the presence of 'run-time' routines within the users' program after compilation. Many people sell software 'tool kits', machine code routines to be merged with the buyers' programs. They do not demand royalties.

If we use a compiler to produce (part or all) of a saleable program, we are told that our ownership of the program is only "less in dispute" and a court will one day have to decide "whether we own it or the compiler company does"! Until they are rich enough to sue us for the total rights, they just want a nominal fee. Nice.

The ownership problem is presently academic, as it is doubtful if any of the advertised compilers could fully handle a really saleable program! Such programs usually require large arrays, both numeric and character (for educational and adventure programs), and/or hi-resolution plot-draw commands (for arcade games).

Compiler companies carefully avoid listing the '20 per cent' of instructions that they can not translate. Very suspicious. May we ask your reviewers to investigate this matter further.

Anyone buying an incomplete compiler should consider the effort and expertise required to integrate the resulting unholy mixture of Basic and machine-code.

Softek and the others should drop this dubious idea of charging such royalties, produce a 100 percent compiler, and charge a reasonable £25. I will happily pay — once. (Until then, we have two options — keep writing in machine code (and taking the tablets) or get a bigger, faster machine!)

The article Tim Langdell complains about ('Copyright', *Popular Computing Weekly*, February 3-9), was primarily about copyright law. To imply that some minor (sic) technical errors invalidate the entire article was "very misleading".

The errors in the article were not so heinous as to warrent such abuse. Such errors are very easy to make.

Object code is 'very like' machine code'. In the micro world, they are identical. However, the 'object code' produced by a mainframe compiler must be further processed (link-edited) before it will run (execute). Depending on one's definition of m/c code, there is a difference between object code (relocatable phase) and 'machine code' (load module).

'Compilers and Assembler': Tim Langdell insists there is a great difference between these two types of language translators. I do not dispute there is a difference, but he rather overstates the compilers abilities. A 'Macro-Assembler' does a similar job to Tim Langdell's compiler.

M G Moscoff
116 Haverstock Hill
London NW3

Inflated interest . . .

Being a lecturer in quantitative business methods and a computer enthusiast, I was very interested in your new series on BBC & Education. I think it is a very good idea and I feel that it should not be restricted to BBC computer only. After all, even on a small ZX81 very respectable educational programs can be implemented.

I write this letter mainly to object to the first article on investment decision making (*Popular Computing Weekly*, February 17-23). Although the program is quite reasonable, the whole thing is spoiled when the article argues that "interest rate . . . is based largely on the rate of inflation". This is completely wrong. We are making great efforts to get rid of this concept and in one article everything that we object to is put in your weekly as truth.

The interest rate arises because everyone prefers today's £1 to tomorrow's £1, ie due to time preference, and this has got nothing whatsoever to do with inflation. There is a 'rate of interest' with no inflation. If there is inflation, the future values must be deflated, not discounted. Then the deflated future values can be discounted using an appropriate rate of interest. The rate of inflation and the rate of interest are practically and conceptually different, and should not be confused.

N Derek
Department of
Business Studies
Liverpool Polytechnic
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Liverpool
Merseyside

Microdrive query

Please could you tell me what all us ZX Spectrum owners are going to do when (if) the much talked of microdrive is released. Will we have to revert back to our cassette recorder to load our old software, or will there be a way of transferring our cassette stored programs onto microdrive floppy tape. What do you think?

I enjoy reading your magazine very much, although I would like to see more Spectrum machine code programs published.

Richard Shergold
45 Seal Road
Selsey
West Sussex, PO20 0HU

Easier, simpler!

Chris Wood's article "Printing by Command" in *Popular Computing Weekly*, January 27, describes a complicated method of printing on the bottom two lines of the Spectrum's screen by *Poking*. A much simpler and very much more versatile method uses *Print #1; At 0*, column number for line 22 and *Print #1; At 1*, column number for line 23. All the normal attributes can be used — *Ink, Paper, Flash, Bright* — in any of the usual combinations.

This is an exceptionally useful feature — scores, menus, count-downs, etc, can be displayed continuously without breaking into the main screen area. For example, a menu of options in a drawing program can be printed on line 22, and a Flashing 'raising to a power' arrow can be printed on line 23 in an appropriate position to indicate the current choice. *Input* "" (null string) acts as a *Cls* on the bottom two lines.

Of course, error codes or input requests will replace any printing on the bottom two lines, but this should present no problems, since these will appear only at the end of a program or when a change takes place. *Pause 0* following a *Print #1; At* operation will hold the scores, etc, at the end of a game.

This procedure can be used to print on more lines at the bottom of the screen by *At 2*, *At 3* and so on, but the text will scroll up into the main screen area after two lines.

B W Coe
4 Doctors Commons Road
Berkhamsted
Herts

Reversing the charges

I have owned a Dragon 32 for two weeks and selected your magazine from amongst the many on offer partly because of the style and partly because of the two Dragon programs (Vol 2 No 7).

The letter headed "Then where's the fault?" and your reply prompted me to write. I have had to make the following changes to the *Reverse* program so that it will run.

```
90   (AC6 6) to read A(6 6)
240  Add THEN 260 to end of line
340  330 to read 310
350  N etc to read N=R-10*INT(R/
     10)+1
410  after 9' not
490  to read PRINT
Renumber the 2nd 600 line to 600
```

As yet I cannot get your Star Game *Dragons Lair* to run properly; line 160 seems to be the problem.

A G Lucas
111 Vicarage Farm Road
Wellingborough
Northants NN8 3EU

We should have known that our reply was tempting fate. The Reverse program was printed incorrectly — apologies to all our readers who have been struggling to enter it.

Dragon's Lair, however, should Run as listed in the magazine.

If you have any further problems, please contact our Software Editor Graham Taylor.

The Kingdom of Cedricl

A new game for Vic20 by Gwyn Jones

A natural continuation of playing computer adventure games is to play a simulation of running your own country King Cedrick runs in 3 5K and sets several of the problems of living in an agrarian warlike society You take the role of King Cedrick and begin your rule in the year 1135 Your kingdom contains 433 loyal people at the start of the game

The four major threats to your people are Bandits, Famine Flood and Invasion

At the end of every year you assign tasks for each of your subjects using your skill and judgement to spot your weaknesses Watch the amount of grain in the granary Your guards will protect the granary from bandits but many are killed

Farmers work in the fields and produce the grain The Dyke-men maintain the dyke to prevent flooding Should the dyke burst you could well lose over half your population in a single year The soldiers although seemingly useless are a vital deterrent to invasion by opposing armies

To succeed in the game you must maintain or increase your population and live a long life The highest population obtained in a single lifetime is 12,768 324 people

Variables used

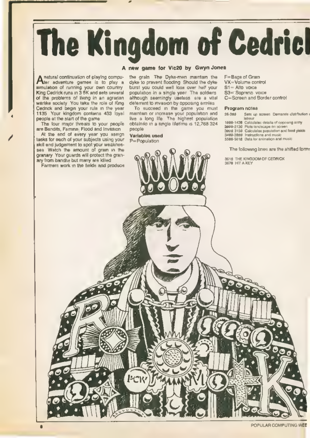
P=Population
F=Bags of Grain
VX=Volume control
S1= Alto voice
S3= Soprano voice
C=Screen and Border control

Program notes

25-260	Sets up screen Demands distribution of labour
1000-1430	Calculates details of opposing army
2000-2130	Plots landscape on screen
3000 3150	Calculates population and food yields
3400-3800	Instructions and music
5500-5610	Data for animation and music

The following lines are the shifted forms

3610 THE KINGDOM OF CEDRICK
3670 HIT A KEY



```
1 S3=36875:VX=36878:C=36879
2 GOTO3400
5 CLR:P=433:F=101:S1=36874:H=7749:C=36879
10 Y=1134
25 PRINTCHR$(142)
30 GOSUB2000
33 Y=Y+1:IFY=1170THEN5000
34 GOSUB1000
35 PRINT" YEAR 1";Y
40 PRINT" DEATHS FAMINE=";DF
50 PRINT" FROM: FLOOD =";DY
60 PRINT"      BANDITS=";DB
80 PRINT" POPULATION=";P
90 PRINT" ";F;" BAGS OF GRAIN"
100 PRINT" DISTRIBUTION OF LABOUR"
110 INPUT" DYKE UPKEEP";PD
120 INPUT"FARMERS";PC
130 INPUT"GUARDS";PB
140 PA=P-(PD+PB+PC)
145 IFPA<0THENPRINT"";TAB(7);"ERROR":
    FORA=1TO1500:NEXTA:GOSUB2000:GOTO35
150 PRINT"SOLDIERS =";PA
160 FORA=1TO1000:NEXTA
165 GOSUB2500
170 GOSUB3000
200 GOTO30
1000 YI=(P/F)*100:IFPA=0THENPA=1
1020 VA=(PA/P)*100
1030 IFYI>10ANDVA<10THEN1300
1040 RETURN
1300 PRINT"":POKEC,10
1310 PRINT" ";TAB(7);"INVASION!":FORA1
    =1TO...:NEXTA1
1320 GOSUB2000
1330 IA=PA+INT(RND(1)*PA)-INT(RND(1)*PA)
1340 IA1=INT(RND(1)*IA)
1350 PA1=INT(RND(1)*PA)
1360 IFPA1<IA1THEN1400
1370 PRINT" YOU WERE DEFEATED
1380 PRINT"BY AN ARMY OF ";(IA*10)
1390 FORA1=1TO4000:NEXTA1:PRINT"":GOTO4050
1400 PRINT" YOUR ARMY WON!!"
1410 PRINT" SOLDIERS LOST=";PA1
1420 P=P-PA1:PA=0
1430 FORA1=1TO2000:NEXTA1:RETURN
2000 POKEC,...:PRINT""
2040 PRINT"
2050 PRINT"
2060 PRINT"
2070 PRINT"
2080 PRINT"
2090 PRINT"
2100 PRINT"
2110 PRINT"                                ";
2120 PRINT"
2130 PRINT" THE KINGDOM OF CEDRICK":RETURN
2500 CO=30720
2501 RESTORE
2505 PRINT" BANDITS!"
2510 READDA
2520 IFDA=0THENRETURN
2530 POKEH+DA,88:POKEH+DA+CO,0
2535 READWA
2537 POKES1,WA
2540 FORA=1TO200:NEXTA
2560 POKEH+DA,160:POKEH+DA+CO,5
2565 POKES1,0
2570 GOTO2510
3000 WF= RND(1)*3
3010 ER= RND(1)*4+6
3020 U=EH*PC*WF
3030 AS=((P*21)/PB↑2)+(RND(1)*20)
3040 IFF<0THEN4000
3045 F=U-(AS*U)/100
3050 DF=(((P*.2)/F)/100)*P
3060 BC=INT(RND(1)*(PD/10))+1
3070 IFBC<.2THENDY=0:GOTO3100
3080 DR=INT(RND(1)*70)+10
3090 DY=(DR/100)*P
3100 BR=INT(RND(1)*10)+1
3110 DB=(BR/100)*P
3120 DF=INT(DF):DY=INT(DY):DB=INT(DB):F=INT(F)
3125 P=P-DF-DY-DB
3127 IFF<0THEN4000
3130 IFP<2THEN4000
3140 IFDY>0THEN F=INT(F*.1)
3150 P=INT(P+(RND(1)*(P/2))+1):RETURN
3400 READD:POKEVX,0:IFD=0THENPOKEVX,10:
     GOTO3500
3450 GOTO3400
3500 PRINT"":POKEC,42
3505 PRINTCHR$(14)
3510 POKE36881,100
3515 PRINT"
3520 PRINT" YOU ARE THE RULER OF"
3525 PRINT" A SMALL KINGDOM "
3530 PRINT" YOU CONTROL THE LOCAL"
3535 PRINT" WORKFORCE AND ARMY."
3540 PRINT" DISTRIBUTE POPULATION"
3545 PRINT" BETWEEN THE DYKE-MEN"
3550 PRINT" (TO STOP FLOODS),THE"
3555 PRINT" FARMERS,THE GRANARY"
3560 PRINT" GUARDS AND THE ARMY"
3565 PRINT" WHICH DEFENDS YOU."
3570 PRINT"
3572 FORI=1?4 TO 30 STEP-1:IFI<110THENPOKEC,
     I:FORA1=1TOI:POKES3,E
3580 FORAA=1TO50:NEXTAA:IFI<110THEN NEXTA1
3585 POKE36881,1
3587 POKES3,0
3590 NEXTI
3595 GETA$:IFA$=""THEN3595
3600 GOTO5
4000 PRINT""
4010 PRINT" YOUR PEOPLE HAVE BEEN"
4020 PRINTTAB(6);" WIPED OUT"
4045 PRINT" ";TAB(6);"HARD LUCK!"
4050 PRINT" ANOTHER GO(Y/N)?"
4060 GETA$:IFA$="Y"THEN5
4070 IFA$<>"N"THEN4060
4100 END
5000 PRINT"":POKE36879,25
5010 PRINT" YOU DIED OF OLD AGE"
5035 PRINT" ";
5040 GOTO4050
5500 DATA 22,159,43,158,66,156,45,154,68,151,
     91,147,114,143,93,139,116,136,138,1
5510 DATA 137,143,136,147,135,151,134,154,133,
     156,132,158,131,159,130,160,0
5520 DATA 209,4,217,8,221,4,225,6
5530 DATA  228,2,225,4,221,8
5540 DATA 215,4,203,6,209,2,215,4
5550 DATA 217,8,209,4
5560 DATA 209,6,207,2,209,4,215,8,207,4,195,8,
     209,4,217,8,221,4,225,6,228,2,225,4
5570 DATA 221,8,215,4,203,6,209,2,215,4,217,6,
     215,2,209,4,207,6,201,2,207,4
5580 DATA 209,12,209,12,229,12,229,6,228,2,
     225,4,221,4,215,4,203,4
5590 DATA 209,2,215,4,217,8,209,4,209,6,207,2,
     209,4,215,8,207,4,195,12,229,12,229
5600 DATA 228,2,225,4,221,8,215,4,203,6,209,2,
     215,4,217,6,215,2,209,4,207,6,201,2
5610 DATA 207,4,209,12,209,0
```

Softly, softly

***David Kelly** talks to Sue Currier, President of the US software house, SoftSync*

SoftSync is one of only several companies in America independently producing and marketing software for the Timex/Sinclair machines — material referred to in the US as third-party software

Like so many companies thriving in the home computer boom, SoftSync came into being by happy accident rather than design Sue Currier was working as a model in New York when she was asked by Alfred Milgrom of Melbourne House if she would start a mail-order software company to sell his programs for the ZX80

She began to sell his two 1K arcade games and quickly built up an extensive mail-order list of ZX80 owners At about this time Sinclair sent out Nigel Searle to set up an American office and the two got together "Nigel would take my tapes all over — it helped sell the machines and he put fly sheets in the boxes pushing our tapes And voilà SoftSync came into being!

Sue then began casting around building up her own list of software from programmers in the US In June 1982 she came over to the UK to licence material "Having had the ZX81 for much longer, you were well ahead of us The first people I looked up were Quicksilva — I took three games from them — and Bug-Byte's *Mazogs* Both were outright winners in Britain at that time

"At around the same time I began to get a great number of submissions from programmers in the US who read the advertisements for our software in magazines like *Sync* and *Syntax* and sent stuff in hoping we would distribute it for them We got so many I had to take on a full-time programmer to sort through them Occasionally we'd get a real winner Eventually I built up a group of about 20 programmers who produce material for us

"SoftSync began to take off and things got ridiculous — I was modelling in the daytime and running the business at all hours through the night At the beginning of June I gave up the struggle and quit modelling!

All of SoftSync's tapes are manufactured in two laboratories in New Jersey and Connecticut and delivered to the company's New York office Here Sue has a crew of what she calls "out-of work actors" who come in from 4 pm to midnight to check and pack the tapes into boxes "Office space is very expensive in New York so as soon as the office is not an office we use it as a packing room — it's an efficient system"

In August Timex took over marketing of the ZX81 — calling it the Timex/Sinclair 1000 "When they began selling the machine over the counter, the whole thing fell apart It changed from a small tightly-knit group of 81 owners to a totally fragmented mess — no one can find the owners

"People go into a store buy a TS1000 and disappear There are no specialist magazines on the stands as there are in Britain and so there is no way of getting in touch with them to provide any sort of back-up Obviously our business has increased but only by a very small fraction of those who have bought a TS1000 in the last six months Between August and December last year Timex sold 600,000 machines"

The only solution was for SoftSync to establish its own sales force The US is divided into 18 districts or buying offices — and these districts apply across the board for all types of consumer goods Each district sales office was contracted to go round the stores with SoftSync's tapes

"What Timex did for me was to tell their salesmen to recommend us if any of their buyers wanted third-party material"

"Timex has killed the TS1000 too soon"

In January everybody trooped off to Las Vegas where Timex announced the American version of the Spectrum — the TS2000 "Since then the whole market has creaked" says Sue

"In the US people want the version with all the bells and whistles so Timex have had to change the Spectrum to accept Rom cartridges — and that has meant that the 2000 won't appear until at least June

"But when they announced the TS2000 in January the bottom fell out of the TS1000 market In effect Timex has killed the TS1000 too soon Now they are worried because Texas are being very aggressive at the moment and the Commodore 64 is selling well for about $400 (£260) and the rumour is that they will drop its price to under $300

"So, Timex must now spend some of its advertising budget allocated to the TS2000 on the TS1000 If they don't try to get back the 1000 market, there won't be a market for the 2000 when it eventually goes on sale

"People in Britain find it very difficult to understand when I tell them the TS1000 market is dead in the US With a million machines sold it doesn't seem possible, but there is buyer resistance now If my salesman goes into a store in say Oklahoma, the buyer for the store says that since the TS1000 isn't selling he doesn't want any software

"It is now a question of turning the buyers around — otherwise the software will never get as far as the consumer

"Timex started re running the TS1000 advertisements last week which they haven't done since October By the time I get back to the US I hope it will be showing signs of picking up — I just think how lucky



we were to get our tapes out by October last year when they could still be sold

"There is a huge market there, but I cannot reach it For ourselves we are placing more advertisements particularly in what I call the retail rags — those magazines aimed specifically at the buyers to try to change their minds

"Another major worry is rack-jobbing This is a new phenomenon which could screw the industry As the software market in the US goes retail, the big chains are not interested in buying from individual suppliers They only want to buy from so-called rack-jobbers These are companies that buy the software and go round all the stores and fill up and check the racks This takes a load off the store manager's mind — he doesn't need to know what is selling and what to order

"The problem is that these rack-jobbers want huge discounts — they are talking about 85 percent off the selling price Now I can't sell to them at those sort of discounts and neither can anybody else Rack-jobbing, if it gets a hold, will potentially put all the third-party software houses out of business

"The American market is over a year behind the UK"

Sue reckons that three or four machines will sell competitively over the next three years — those from Timex TI and Commodore "I'm going to begin distributing software for the Commodore 64, TI 99/4 and 99/2 as well as the Sinclair computers — whichever one sells I'll be there!

"I have been over in Britain looking-up Spectrum My software will be ready to go the minute the TS2000 is ready As for the 64, there is no software for it either in Britain or the States — but I expect there to be a huge amount appearing very soon

"In many ways the American market is a year and-a-half behind that in the UK For example there are only two specialist microcomputer magazines in the US — and they both have a small circulation"

Sue grins "I am not as negative as I sound about the American situation I think the market in the US has done pretty much what it did in Britain when the Spectrum was announced It is just a lull" ■

Football addict

***John Scriven** enters the world of Spectrum adventures and emerges as a football manager*

Late one warm evening in 1978, I was tidying-up after completing a project that had already used up too much of my time. The screen of the VDU cast a pale orange glow round the darkened room. I leaned back in the chair and glanced at my watch. 10.30 — time enough to pour myself a well-earned beer and check through the file catalogue.

Using a time-sharing system meant that my colleagues were always acquiring software and dumping it in our shared library. Perhaps there would be something relaxing, something soothing, or something more challenging than another lunar simulation or galactic pinball game. All the old favourites were there, trickling up the screen, but one new title caught my eye — Adventure.

I had half an hour or so before I had intended locking up, and so I loaded the file. I typed *Run* and sat back. "You are standing outside a house. There is a stream at your feet."

This was the sentence that was to rearrange my life for the next few weeks, and even now can ensnare me when I should be pursuing other activities. Without knowing, I had been absorbed into the labyrinthine mysteries of adventure programs. I explored the area round the house, found the cave and even managed to bring back some bars of silver. Rather like Flynn in the film *Tron*, I had been sucked inside the computer.

For the next few weeks I spent all my spare moments getting further and further into the system. Some of my colleagues were also ensnared by the insidious Adventure bug and lunchtime conversations were no longer dominated by the merits or otherwise of Chelsea and Samuel Smith's liquid refreshment. The interchange was more likely to be: "I'll tell you how to get the pearl out of the giant clam if you'll tell me how you got the gold chain off the bear."

Even the senior common room was taken over by maps of routes, and those with American connections were badgered to ask their friends back home for more complex versions.

It was therefore with some pleasure that I noticed that Adventure programs were beginning to infiltrate the world of home computers. First Apples and Pets, but then for machines within the price range of most people. The programs I am considering in this review are not necessarily the best (especially with new adventures appearing every month), but they do demonstrate features that are worth coming back to several times.

Although I enjoy well-written, fast action, arcade games, they need to be novel and interesting to prevent boredom setting in quickly. Adventure programs, too, have to be carefully written to hold the attention for any length of time. If they are too easy they become boring — if too difficult, they become frustrating.

Original theme

Adventure from Abersoft closely follows the original theme of cave exploration and treasure collection. There are many locations and the descriptions are detailed the first time you reach a particular place.

As a purely textual adventure, it relies on the same techniques as a novel to build-up an internal picture of the locations. In a book, you are forced to follow the directions of the author who controls the characters like a god. In adventure games, you have a certain amount of free will. Abersoft's version is complex and entertaining and is well worth the price of £9.95, as you are unlikely to find every location in less than two months.

Pimania, from Automata, combines text with graphics to produce an entertaining adventure program that mixes a computer exploration with a real life treasure hunt in a humorous fashion — an alternative title should be *Monty Python meets Masquerade*. As with most adventure games, the aim is to seek out various objects that may or may not be important to you. These can be as diverse as hula hoops and cans of beans, so it is important to test the usefulness of everything.



At different locations you are met by the Pi-man in person who can be hungry or lonely or bored. Offering him different objects may produce a gift in return, or you may just make him angry. The colour and sound features of the Spectrum are well-employed, and this game is appealing to all ages, which could not be said of some of Automata's earlier "adult" offerings! Indeed, the Pi-man will give you an unpleasant reminder if you use uncouth language to him.

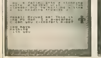
The objects are in different locations each time round, although the locations themselves remain the same. To avoid the opening rituals each time, it is possible to save the game on cassette at the particular stage you have reached.

What makes *Pimania* more appealing is the fact that hidden within the insane world of the Pi-man are several clues that will lead the lucky traveller to a "location in time and space" where they will be the recipient of, not a can of worms, but a rather beautiful sundial made of gold and jewels. If you have not yet tried *Pimania*, it's well worth seeking out, and should provide you with a few merry moments, particularly if your humour is as misguided as my own.

The Hobbit is a book that I enjoyed reading when I was at college. Set in the fictitious land of Middle Earth, complete with elves and trolls, it provides a gentle introduction to Tolkien's masterwork, *Lord of the Rings*, which can be daunting by reason of its size alone.

It was with a certain amount of trepidation that I approached this cassette. I do not usually enjoy "the film of the book", and I was afraid that my images of Middle Earth would not coincide with the images in the program. However, I need not have worried. Combining text and graphics, Melbourne House's version of *The Hobbit* was no disappointment.

The start of the program is Bilbo Baggins' little house in Hobbiton. Gandalf the Wizard and Thorin the Dwarf are both present and one of them hands you a map





Most fresh locations have a picture of the scene without I am pleased to see attempting to draw the characters Each picture was drawn initially by an artist, and the result transferred to the program The excellent graphics point the way for other programmers

The adventure closely follows the route and experiences encountered in the book so it's a good idea to read this first — no problem as a copy comes with the cassette The exciting difference is that it is possible to converse with all the characters that you meet and ask their assistance I don't think it's giving too much away to use the example of Elrond Ask his assistance and he will read the map or point out the best route

If you are determined to undermine the high moral tone that Tolkien set it is quite permissable to enter "kill Gandalf", but don't say I didn't warn you!

It is perhaps a pity that those people most likely to purchase this game probably already own a copy of the book — it would be nice to simply buy the cassette In spite of this I would recommend this game to anyone who likes Tolkien or novel adventure games

Adventure games can appeal to all tastes, simply by changing the scenario One game that does this successfully is *Super Spy* from Richard Shepherd A lone game in machine code, this allows you to emulate the exploits of a certain member of Her Majesty's Secret Service as he fights the forces of evil

Opportunities are available to escape the constraints of this country and choose different locations in the world to seek out a missing plane and defuse the nuclear missile it carries In order to accomplish this there are several sub-tasks that must be tackled first At the start you have to choose suitable weapons before you can seek out Dr Death's island

Success depends largely on how much luck you have in guessing the place name from the occasional clue On the way, you will be accosted by various priests, midgets and thugs who attempt to impede your progress If you try to run away, the message "Remember you're British" appears on the screen

Should you eventually reach the secret island, you will probably discover that you have run out of weapons and that reincarnation is the only option open to you! After a few attempts you may find the location of Dr Death's lair (with or without recourse to the hidden supply of benzedrine) The next stage consists of negotiating a 3-D maze that incorporates excellent graphics Although your strength is brought up to maximum, there is an evil creature who lurks the corridors and who is difficult (in my case almost impossible) to avoid

My main criticism of the game is that once you are killed you have to start again and cope with all the early stages before you reach the more interesting sections Each game, however, is different and calls for a wide range of skills to achieve success The game can be saved at suitable points and is good value at £6 50

Last game

The last game I have included is not one that would always be included in the category of adventure games and yet it offers role-playing use of different facilities to achieve results as well as involving a good mixture of skill and luck The game in question is *Football Manager* from Addictive Games Since it does not fit readily into any of the accepted genres of computer games, such as arcade adventure, educational etc, it probably does not get the reviews it deserves

As can be guessed from the title the role one has to play is that of managing a football team At the start you choose a team name from the selection offered or provide your own and are given real-life names for the players Again, there is the option to add your own name and that of your friends who will play alongside the likes of Keegan and Robson

The object naturally enough is to rise to the top of the First Division, playing FA Cup matches at the same time This can take several seasons and depends on your skill in selecting useful players with the right sort of abilities Luckily you can save the game at any stage

Team lists appear on the screen and your 11 men can be selected in different configurations If for example you are playing against a strong attacking team you can select more defensive players Some of your potential team may be injured, and each match takes its toll in terms of physical energy and morale

The games themselves are shown as a series of edited highlights incorporating a 3 D view of the pitch with animated players This is one of the best features of the game and it is quite exciting to watch one of your team dribble past the defence and put the ball in the net As the manager you can only watch from the touch line hoping that you have made the wisest choice of players With the gate-money, you can acquire fresh blood or put your feeble players on the transfer list.

This game is an excellent simulation covering most aspects of the real life version and is enjoyable to anyone with the slightest interest in soccer

In most of the programs mentioned here I have attempted to give the flavour of the games without giving too many secrets away Discovering the features for the first time is one of the main pleasures of adventure games after all, you would not appreciate being told "who-dunnit" at the start of an Agatha Christie book

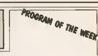
Some of you may prefer all-text adventures, some those with exciting graphics some like to explore well-trodden paths and others fresh pastures each time It is up to you to sample those that seem more appealing

As to adventure games and their future it seems likely that they will incorporate more skill sections and use more advanced graphics As computer hardware improves so will the potential to create new worlds There must be countless programs as yet unwritten just waiting to trap the unwary and reward the resourceful ■

Firm	Program	Cost
Abersoft Maes Afallen Bow Street Dyfed SY2 5BA	*Adventure*	£9 95
Richard Shepherd Software Freepost 22 Green Leys Maidenhead Berkshire SL6 5BY	*Super Spy*	£6 50
Automata 65a Osborne Road Portsmouth Hampshire PO5 3LR	*Pimania*	£8 95
Addictive Games PO Box 278 Conniburrow Milton Keynes Buckinghamshire	*Football Manager*	£7 95
Melbourne House 131 Trafalgar Road Greenwich London SE10	*The Hobbit*	£14.95

OPEN FORUM

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the *Program of the Week* double our new fee of £6 for each program published.



Matrix

on Vic20

This program calculates the product of two matrices and prints out the resulting matrix. The user is asked to input the sizes of both matrices and then if it is possible to multiply the matrices the program asks for each entry of the two matrices to be input. If the matrices cannot be multiplied the user is given the opportunity to input new matrix sizes.

Variables used
R1=number of rows in matrix A
R2=number of rows in matrix B
C1=number of columns in matrix A
C2=number of columns in matrix B
M1=array storing matrix A
M2=array storing matrix B
Sum=array storing matrix AB, the product of A and B
A B I,J K S T=counters.

The program can be run on most machines with minimal modification. The inverse heart symbol is used to clear the screen.

```
10 REM MATRIX MULTIPLIER
20 REM COPYRIGHT
50 REM INPUT SIZE OF MATRICES
40 PRINT"□"
100 PRINT"******MATRIX A******"
110 PRINT"NUMBER OF ROWS PLEASE"
120 INPUTR1
125 PRINT
130 PRINT"NUMBEP OF COLUMNS      PLEASE"
140 INPUTC1
145 PRINT
150 PRINT"******MATRIX B******"
160 PRINT"NUMBER OF ROWS PLEASE"
170 INPUTR2
175 PRINT
180 PRINT"NUMBER OF COLUMNS      PLEASE"
190 INPUTC2
200 IFC1<>R2THEN210
205 GOTO220
208 PRINT
210 PRINT"□":PRINT"INCOMPATABLE MATRIX    SIZES PLEASE
INPUT NEWMATRICES.":PRINT:GOTO 100
215 DIMM1(R1,C1),M2(R2,C2),SUM(R1,C2)
220 REM INPUT MATRICES
225 PRINT"□INPUT MATRIX A■"
230 FORA=1TOR1
240 FORB=1TOC1
245 PRINT"ROW"A"COLUMN"B"?"
250 INPUTM1(A,B)
260 NEXTB,A
270 PRINT"□INPUT MATRIX B■"
310 FORA=1TOR2
320 FORB=1TOC2
325 PRINT"ROW"A"COLUMN"B"?
330 INPUTM2(A,B)
340 NEXTB,A
345 PRINT"□"
430 REM CALCULATE PRODUCT
440 FOR I=1 TO R1
450 FOR J=1 TO C2
460 FOR K=1 TO R2
470 SUM(I,J)=SUM(I,J)+M1(I,K)*M2(K,J)
480 NEXTK,J,I
490 REM PRINT RESULT
492 PRINT"THE ANSWER IS;"
495 PRINT
500 FOR S=1TO R1
510 FOR T=1 TOC2
520 PRINTSUM(S,T);:NEXTT:PRINTCHR$(13);:NEXTS
```

Matrix
by I Shambrook

Number Conversion

on BBC Micro

This program will work on any BBC micro and converts numbers from any base <=16 to any other base <=16. You first enter the original base and the number to be converted; this number is converted to decimal (using *Procdecimal*) and after the new base is entered the required number is calculated (using *Procother*) and printed. It can be very useful to convert binary numbers to decimal when defining characters.

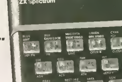
```
10 ONERROR RUN
20 MODE7:VDU23,1,0;0;0;0;:PROCmenu:GOTO20
30 END
40 DEFFNdecimal(P$,BASE)
50 DEC=0:IF P$>""THEN FORK=1TOLEN(P$):de=ASC(MID$(P$,K,1))
   -48:DEC=DEC*BASE+de+(de>9)*7:NEXT
60 =DEC
70 DEFFNother(NUM,BASE):H$=""
80 BASE$=LEFT$("0123456789ABCDEF",BASE)
90 IFNUM THEN A=INT(NUM/BASE):H$=MID$(BASE$,1+NUM-A*
   BASE,1)+H$:NUM=A:GOTO90
100 =H$
110 DEFPROCmenu
120 CLS:PRINTCHR$141;CHR$130;TAB(8);"NUMBER CONVERSION"'
   CHR$141;CHR$130;TAB(8);"NUMBER CONVERSION"'TAB(12);"
   by J.P.Riggs"
130 PRINT'''This program will allow conversion of a"''number
   from a specified base to another"''base. Only binary to
   hex allowed (16)."
140 PRINT'CHR$129;"e.g. FF HEX is 255 in decimal"''
150 INPUT"ENTER NO.for original base "OB
160 INPUT"ENTER actual number "OB$
170 decimal=FNdecimal(OB$,OB)
180 INPUT"ENTER NO.of new base "NB
190 newnum$=FNother(decimal,NB)
200 @%=0:PRINT''CHR$131;OB$;" base ";OB;" is "'CHR$134;
   newnum$" in base "NB
210 PRINT''CHR$136;"PRESS SPACE FOR ANOTHER NUMBER"
220 REPEAT:UNTILGET=32:ENDPROC
```

Number Conversion
by J P Riggs

Sinclair ZX Spectrum

16K or 48K RAM... full-size moving-key keyboard... colour and sound... high-resolution graphics...

From only £125!



First there was the world-beating Sinclair ZX80 The first personal computer for under £100

Then the ZX81 With up to 16K RAM available and the ZX Printer Giving more power and more flexibility Together, they've sold over 500 000 so far to make Sinclair world leaders in personal computing And the ZX81 remains the ideal low-cost introduction to computing

Now there's the ZX Spectrum! With up to 48K of RAM A full-size moving-key keyboard Vivid colour and sound High-resolution graphics And a low price that's unrivalled

Professional power–personal computer price!

The ZX Spectrum incorporates all the proven features of the ZX81 But its new 16K BASIC ROM dramatically increases your computing power

You have access to a range of 8 colours for foreground background and border together with a sound generator and high resolution graphics

You have the facility to support separate data files

You have a choice of storage capacities (governed by the amount of RAM) 16K of RAM (which you can uprate later to 48K of RAM) or a massive 48K of RAM

Yet the price of the Spectrum 16K is an amazing £125! Even the popular 48K version costs only £175!

You may decide to begin with the 16K version If so you can still return it later for an upgrade The cost? Around £60

Ready to use today, easy to expand tomorrow

Your ZX Spectrum comes with a mains adaptor and all the necessary leads to connect to most cassette recorders and TVs (colour or black and white)

Employing Sinclair BASIC (now used in over 500 000 computers worldwide) the ZX Spectrum comes complete with two manuals which together represent a detailed course in BASIC programming Whether you're a beginner or a competent programmer you'll find them both of immense help Depending on your computer experience you'll quickly be moving into the colourful world of ZX Spectrum professional-level computing

There's no need to stop there The ZX Printer – available now – is fully compatible with the ZX Spectrum And later this year there will be Microdrives for massive amounts of extra on-line storage, plus an RS232/network interface board

Key features of the Sinclair ZX Spectrum

- Full colour – 8 colours each for foreground, background and border, plus flashing and brightness-intensity control
- Sound – BEEP command with variable pitch and duration
- Massive RAM – 16K or 48K.
- Full size moving key keyboard – all keys at normal typewriter pitch with repeat facility on each key
- High-resolution – 256 dots horizontally x 192 vertically each individually addressable for true high-resolution graphics
- ASCII character set – with upper- and lower case characters
- Teletext-compatible – user software can generate 40 characters per line or other settings
- High speed LOAD & SAVE – 16K in 100 seconds via cassette with VERIFY & MERGE for programs and separate data files
- Sinclair 16K extended BASIC – incorporating unique one-touch keyword entry, syntax check, and report codes

rum

The ZX Printer – available now

Designed exclusively for use with the Sinclair ZX range of computers, the printer offers ZX Spectrum owners the full ASCII character set – including lower-case characters and high resolution graphics.

A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions. Printing speed is 50 characters per second, with 32 characters per line and 9 lines per vertical inch.

The ZX Printer connects to the rear of your ZX Spectrum. A roll of paper (65ft long and 4in wide) is supplied, along with full instructions. Further supplies of paper are available in packs of five rolls.

The ZX Microdrive – coming soon

The new Microdrives, designed especially for the ZX Spectrum, are set to change the face of personal computing by providing mass on-line storage.

Each Microdrive can hold up to 100K bytes using a single interchangeable storage medium.

The transfer rate is 16K bytes per second, with an average access time of 3.5 seconds. And you'll be able to connect up to 8 Microdrives to your Spectrum via the ZX Expansion Module.

A remarkable breakthrough at a remarkable price. The Microdrives will be available in the early part of 1983 for around £50.





ZX Spectrum software on cassettes – available now

The Spectrum software library is growing every day. Subjects include games, education and business/household management. Flight Simulation. Chess. Planetoids. History. Inventions. VU-CALC. VU-3D. Club Record Controller... there is something for everyone. And they all make full use of the Spectrum's colour, sound and graphics capabilities. You'll receive a detailed catalogue with your Spectrum.

ZX Expansion Module

This module incorporates the three functions of Microdrive controller, local area network, and RS232 interface. Connect it to your Spectrum and you can control up to eight Microdrives, communicate with other computers, and drive a wide range of printers.

The potential is enormous, and the module will be available in the early part of 1983 for around £30.

sinclair

Sinclair Research Ltd, Stanhope Road, Camberley, Surrey GU15 3PS
Tel Camberley (0276) 685311

How to order your ZX Spectrum

BY PHONE – Access, Barclaycard or Trustcard holders can call 01-200 0200 for personal attention 24 hours a day, every day. BY FREEPOST – use the no-stamp needed coupon below. You can pay by cheque, postal order, Access, Barclaycard or Trustcard.

EITHER WAY – please allow up to 28 days for delivery. And there's a 14-day money-back option, of course. We want you to be satisfied beyond doubt – and we have no doubt that you will be.

To: Sinclair Research, FREEPOST, Camberley, Surrey, GU15 3BR — Order

Qty	Item	Code	Item Price £	Total £
	Sinclair ZX Spectrum – 16K RAM version	100	125.00	
	Sinclair ZX Spectrum – 48K RAM version	101	175.00	
	Sinclair ZX Printer	27	59.95	
	Printer paper (pack of 5 rolls)	16	11.95	
	Postage and packing: orders under £100	28	2.95	
	orders over £100	29	4.95	
			Total £	

Please tick if you require a VAT receipt ☐

*I enclose a cheque/postal order payable to Sinclair Research Ltd for £ ______

*Please charge to my Access/Barclaycard/Trustcard account no

*Please delete/complete as applicable

Signature

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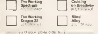
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The Working Dragon 32

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Breakout

on Ace

This program is a version of the standard breakout game. The player must keep bouncing the ball back to the top of the screen in order to demolish the wall. He has 5 balls to do this, one being lost every time he misses. The player controls the movement of his bat by pressing A to move it to the left and L to move it to the right. The game will just fit into the standard 3K ACE.

Program notes

DRAW	Initialises the screen and draws the walls
MOVE	Increases or decreases the number on top of the stack, depending on the key pressed
YOUMOVE	Moves and redraws your bat.
CHECK	Checks if the ball has gone off the bottom of the screen (its position is greater than 9913). If so it decreases the number of balls and continues if there are any left
BALLDRAW	Checks if the ball has hit a brick (increasing your score if so) and draws the ball
BALLMOVE	Checks if the ball has hit anything and adjusts its direction, then moves it.
B	Plays the game (I kept the name short to save typing as this is the word you must type to run the program)
SPEED	Sets the speed of the game by adjusting the variable S. Typing a number then SPEED sets the speed, 0 being the fastest, 1000 being slow

For those interested, here is a list of the items on the stack during the game:

(TOS), the position of the ball on the screen, the X displacement at each move, the Y displacement at each move, the score, your position on line 21 of the screen.

Anything that appears in brackets inside quotes should be taken as it reads, eg *Graphic 4* is the graphic symbol on the 4 key obtained by pressing *Shift* and 9 then *Symbol Shift* and 4. It is important to get the print statement for the score and amount of balls correct, as the number of balls left is fetched (@) for checking.

```
: YOUMOVE
 INKEY
 IF
  5 ROLL DUP 21 SWAP
  AT 2 SPACES MOVE DUP
  21 SWAP AT ." (GRAPHIC
  3 GRAPHIC 3)"
  5 ROLL 5 ROLL 5
  ROLL 5 ROLL
 ELSE
  50 0
  DO
  LOOP
 THEN
;

: CHECK
 DUP 9913 >
 IF
  32 SWAP C! 9246 C@
  DUP ASCII 0 =
  IF
   ABORT
  ELSE
   1- 9246 C! 9505 15403
   C@ 1 AND +
  THEN
 THEN
;

: BALLDRAW
 DUP C@ 160 =
 IF
  ROT NEGATE ROT ROT 4
  ROLL 1+ 0 8 AT
  DUP . 4 ROLL 4
  ROLL 4 ROLL
 THEN
 79 OVER C!
;
400 VARIABLE S

: DRAW
 CLS 0 1 AT ." Score: 0
     Balls: 5"
 4 0 AT 32 5 * 0
 DO
  ." (INVERSE SPACE)
 LOOP
 1 0 AT ." (GRAPHIC 4)
 30 0
 DO
  ." (INVERSE GRAPHIC 3)
 LOOP
 ." (INVERSE GRAPHIC 7)"
 23 2
 DO
  I 0 AT ." (GRAPHIC 5)"
  I 31 AT ." (INVERSE GRAPHIC 5)"
 LOOP
;

: MOVE
 INKEY DUP 97 = SWAP
 108 = OVER OR
 IF
  IF
   1-
  ELSE
   1+
  THEN
 ELSE
  DROP
 THEN
 1 MAX 29 MIN
;

: BALLMOVE
32 OVER C! OVER OVER
+ C@ DUP 32 =
SWAP 160 = OR 0=
IF
 SWAP NEGATE SWAP
THEN
DUP 4 PICK + C@
DUP 32 = SWAP 160
= OR 0=
IF
 ROT NEGATE ROT ROT
THEN
OVER OVER + 4 PICK
+ C@ DUP 32 =
SWAP 160 = OR 0=
IF
 ROT NEGATE ROT NEGATE ROT
THEN
OVER 4 PICK + +
BALLDRAW
;

: B
8 0 32 1
9505 DRAW 21 8 AT
." (GRAPHIC 3 GRAPHIC 3)"
BEGIN
 YOUMOVE BALLMOVE YOUMOVE CHECK S
 @ 0
 DO
 LOOP
 0
UNTIL
;

: SPEED
 S !
;
```

Breakout
by Colin Dooley

Cogitate

on Spectrum

This is a test of short-term memory. Three digits are displayed on the screen; they are then removed and a beep sounds. When you have two, remember them and type them in order. Then four numbers are displayed, and so on. When you make a mistake, you have the chance to try again with the same number of digits, stop, or run the program again. If you carry on, a tally is kept of the number of failures!

Different individuals will find that they are unable to remember more than so many digits. The program will be of help in determining whether various health foods and nutritional supplements, such as the Life Extension Foundation's Cognitex, are benefiting the individuals using them. It can also similarly be used in evaluating the claims made by proponents of various mental exercises to improve short term memory.

The program is written for the Sinclair Spectrum, but is readily convertible to other machines, as no pokes or special graphics are used.

```
100 RANDOMIZE : INK 7: PAPER 1: BORDER 1: CLS
110 LET nn=3: LET errors=1
120 DIM a(176): REM Thid large figure can be
    reduced to save memory
130 CLS : FOR n=1 TO nn: LET a(n)=INT (10*RND)
   : NEXT n
140 GO SUB 2000
150 PRINT AT 10,0;
160 GO SUB 1000
170 FOR n=0 TO 30*nn: NEXT n
180 CLS : GO SUB 2000
190 BEEP .1,1
300  FOR n=1 TO nn
201 IF INKEY$<>"" THEN GO TO 201
202 IF INKEY$="" THEN GO TO 202
203 LET a$=INKEY$: LET a=VAL a$: IF a=0 AND a$<>
   "0" THEN GO TO 201
204 IF a<>a(n) THEN GO TO 300
204 NEXT n
210 LET nn=nn+1
220 GO TO 130
300 CLS : PRINT "Your score was ";nn;" digits,
    with ";errors;" wrong attempt
IF errors>=2 THEN PRINT "s";
302 PRINT : PRINT
310 PRINT "The last set you were given was";
```

Turn to page 21

```
 320 GO SUB 1000: PRINT
 330 PRINT "Random number ";n;" was ";a(n)
 340 PRINT "You thought it was ";a
 350 PRINT : PRINT  PAPER 4;"Press R to play again,A to stop,P to play on as you were
 355 PRINT : PRINT  PAPER 2;"Cogitate is©Reeves  Telecomunic-ations Laboratoria Ltd  1982.A  copy  of  this  program  isavailable with some others on  cassette $ £4 from  the  companyat West Towan House, Porthtowan,Truro, Cornwall TR4 8AX.
 360 IF INKEY$<>"" THEN  GO TO 360
 365 IF INKEY$="" THEN  BEEP .01,.01: GO TO 365
 370 IF INKEY$="r" OR INKEY$="R" THEN  RUN
 375 IF INKEY$="p" OR INKEY$="P" THEN  LET errors=errors+1: GO TO 130
 380 IF INKEY$="A" OR INKEY$="a" THEN  STOP
 390 BEEP .1,.1: GO TO 360
 999 STOP
1000 REM Sub to print array of random numbers
1010 FOR m=1 TO nn
1020 IF (m-1)/16=INT ((m-1)/16) THEN  PRINT
1030 PRINT a(m);" ";
1040 NEXT m: RETURN
2000 PRINT  PAPER 4;"                              You must  remember  these d igitsand  enter  thes in  order afterthe beep.
                 ": RETURN
```

Cogitate
by John de Rivez

Numjug

on ZX81

At the beginning of the game the ZX-81 comes up with the numbers from 1 to 9 all juggled up like this 645327819

All you have to do is to arrange these numbers into ascending order so that it ends up as 123456789 It is not as simple as it sounds and can be quite frustrating

How to play

ZX81 comes up with 653421987 and you want to reverse the first three so you simply type 3 after the statement **how many** The rest is all done by the ZX-81 In this case the result would be 356421987 As you can see the first 3 numbers are reversed It is important to think ahead to get a good score (the lower the better).

It was a struggle getting this game to fit on the 1K machine!

Program notes

1	counter for the number of attempts
2 to 5	fills up array A with 0
6 to 10	juggles up the contents of array A
14	call the procedure to print the numbers
15	increment the number of attempts
16 to 20	waits for the number to reverse
21 to 25	reverses the numbers
26	calls the procedure to print the numbers
27 to 25	checks to see if the numbers are in order
34 to 38	procedure to print the numbers

```
 1 LET T=0
 2 DIM A(9)
 3 FOR I=1 TO 9
 4 LET A(I)=0
 5 NEXT I
 6 FOR I=1 TO 8
 7 LET R=INT (9*RND)+1
 8 IF A(R)>0 TNEN GOTO 7
 9 LET A(R)=1
10 NEXT I
11 FOR I=1 TO 9
12 IF A(I)=0 TNEN LET A(I)=9
13 NEXT I
14 GOSUB 34
15 LET T=T+1
16 PRINT " HOW MANY"
17 INPUT X
18 CLS
19 IF X>9 TNEN PRINT "NO"
20 IF X>9 THEN GOTO 16
21 FOR I=1 TO INT (X/2)
22 LET Y=A(I)
23 LET A(I)=A(X-I+1)
24 LET A(X-I+1)=Y
25 NEXT I
26 GOSUB 34
27 FOR I=1 TO 9
28 IF A(I)<>I TNEH GOTO 15
29 NEXT I
30 PRINT "  IN ORDER"
31 PRINT
32 PRIHT T;" TRIES"
33 GOTO 999
34 PRINT
35 FOR I=1 TO 9
36 PRIHT A(I);
37 NEXT I
38 RETURN
```

Numjug
by Shingo Suginte

Invert

on Vic20

This program is written for the Vic20, where the first screen location is 7680 What the program does is to convert everything on the screen to its background colour

When you have typed in the program check it and save it because it is machine code

To run the program type in SYS(673) and everything on the screen will be converted, on some computers this is called flash This program can make explosions look better Ex For A = 1 TO 100 SYS673 NEXT

This program is stored from 673 to 708 where Basic can't get to it so you can *New* the program and it will still be there

```
LISTING IN MACHINE CODE.
LDAIM 0        INY
TAY            BNE 2
STAZ 252       INCZ 253
LDAIM 30       STXZ 252
STAZ 253       CPXIM 250
LDAIY 252      BNE 236
CLC            LDXZ 253
ADCIM 128      CPXIM 31
STAIY 252      BNE 230
LDXZ 252       RTS
```

```
1 PRINT"INVERT BY D,SELWOOD,"
2 DATA 169,0,166,133,252,169,30,133,253,177,252,24,105,128,145,252,166,252
3 DATA 232,208,2,230,253,134,252,224,250,208,236,166,253,224,31,208,230,96
4 FORN=673TO708:READM:POKEN,M:NEXT
5 END
```

Invert
by D Selwood

OPEN FORUM

Arithmetic

on Lynx

This program can perhaps best be described as an educational game. By providing a score, based upon time taken to answer 10 arithmetical problems and providing a sense of urgency through use of sound, the program both entertains and educates at the same time.

The program has been specially written for the new Lynx computer, although it could be adapted to run on other machines by appropriate adaption of the subroutine at line 400.

The program begins by requesting What Level? This variable sets the maximum number that can be selected in any sum. The program then goes through a loop (beginning at line 180) in which two sum variables A and B are selected.

The sum is then displayed on the screen (line 240) before the program enters another loop (line 250). In this loop a bleep with rising pitch is followed by a call to a subroutine (line 400) which scans the keyboard searching only for the depression of a number or delete key, before returning to the counting loop.

As soon as the correct answer is entered the count down stops and the program moves on to the next question. When ten sums have been completed or the time runs out, the program displays the score before requesting Do You Want To Play Again?

```
10    CLS
20    DIM B$ (3)
30    WINDOW 11,123,30,245
40    PRINT "WHAT LEVEL"
50    LET F=0
60    INPUT B
70    GOTO 160
80    CLS
90    PRINT @ 30,130
100   PRINT "YOUR SCORE WAS", F
110   PRINT "DO YOU WANT TO PLAY AGAIN"
120   INPUT A$
130   IF A$ = "YES" THEN GOTO 160
140   IF A$ = "NO" THEN GOTO 390
150   GOTO 110
160   LET F=0
170   CLS
180   FOR I = 1 TO 10
190   LET B$ = ""
200   LET A = RAND(B)
210   LET C = RAND(B)
220   IF A = 0 AND C = 0 THEN GOTO 210
230   LET D = A + C
240   PRINT@ 60,100,A;" + ";C;" = "
250   FOR J = 240 TO 100 STEP -4
260   BEEP (J),10,51
270   GOSUB 400
280   LET E = VAL(B$)
290   PRINT@ 20 110
300   PRINT B
310   IF E=D THEN GOTO 350
320   NEXT J
330   NEXT I
340   GOTO 80
350   LET F = F+J
360   CLS
370   LET J = 120
380   GOTO 320
390   END
400   LET A$ =""
410   IF INP([illegible]) = 254 THEN LET A$ ="1"
420   IF INP([illegible]) = 254 THEN LET A$ ="2"
430   IF INP([illegible]) = 254 THEN LET A$ ="3"
440   IF INP([illegible]) = 253 THEN LET A$ ="4"
450   IF INP([illegible]) = 254 THEN LET A$ ="5"
460   IF INP([illegible]) = 254 THEN LET A$ ="6"
470   IF INP([illegible]) = 254 THEN LET A$ ="7"
480   IF INP([illegible]) = 253 THEN LET A$ ="8"
490   IF INP([illegible]) = 254 THEN LET A$ ="9"
500   IF INP([illegible]) = 254 THEN LET A$ ="0"
510   IF INP([illegible]) = 254 THEN LET B$ =""
520   LET B$ = B$ + A$
530   LET A$ =""
540   RETURN
```

Arithmetic
by Philip Barber

Intervels

on BBC Micro

The program is in the form of a musical test which plays two notes and asks you what the interval is.

At the start of the program, the scale of C major is played. The computer then plays C and a random note and you must state what the interval is. If you wish to hear the two notes again before answering, you must type 99.

For example, if the notes played were C and F, the interval would be a 4th and the correct answer would be 4.

I believe that the program will prove helpful to both pupils and teachers of music.

Program notes

10 Defines graphic character (musical note)
40 PROCscale plays scale of C major as an introduction
50-210 Question loop which asks question, plays the two notes and indicates if answer is correct or wrong using *Proccor* and *Procwrong*
220-240 Defines *Proccor*
250-300 Defines *Procwrong*
310-380 Defines *Procend* which repeats PROCscale again and gives score out of 10
390-440 Defines *Procscale*
450-460 Data for scale and intervals

```
10 VDU 23,240,4,6,5,4,28,60,120,112
20 CLS:SC=0
30 PRINTTAB(13,2)CHR$240" INTERVALS "CHR$240
40 PROCscale
50 FOR Q=1 TO 10:MODE 1
60 PROCscreen
70 CLS
80 PRINTTAB(13,2)CHR$240" INTERVALS "CHR$240
90 PRINTTAB(2,10)"WHAT IS THE FOLLOWING INTERVAL"
100 PRINT"TYPE 99 TO REPEAT"
110 FOR T=1 TO 1000:NEXT
120 S=RND(7)
130 FOR R=1 TO S:READ N:READ A:NEXT R
140 SOUND 1,-15,5,10
150 SOUND 1,0,0,1
160 SOUND 1,-15,N,10
170 INPUT AN:IF AN=99 THEN 140
180 IF AN=A THEN PROCcor ELSE PROCwrong
190 FOR T=1 TO 3000:NEXT
200 IF Q=10 THEN PROCend
210 RESTORE 460:NEXT Q
220 DEF PROCcor
230 PRINT"CORRECT":SC=SC+1
240 ENDPROC
250 DEF PROCwrong
260 PRINT"WRONG":PRINT"IT WAS A ";
270 IF A<4 THEN 290 ELSE PRINTA"th"
280 ENDPROC
290 IF A=2 THEN PRINTA"nd"ELSE PRINTA"rd"
300 ENDPROC
310 DEF PROCend
320 PROCscale
330 FOR T=1 TO 1000:NEXT :COLOUR 130:CLS
340 PRINT TAB(13,5)CHR$240" INTERVALS "CHR$240
350 PRINTTAB(5,15)"YOU SCORED "SC" OUT OF 10"
360 END
370 DEF PROCscreen
380 COLOUR 129:COLOUR 0
390 ENDPROC
400 DEF PROCscale
410 RESTORE 450
420 FOR M=1 TO 8:READ T:SOUND 1,-15,T,5:NEXT M
430 FOR T=1 TO 5000:NEXT
440 ENDPROC
450 DATA 5,13,21,25,33,41,49,53
460 DATA 13,2,21,3,25,4,33,5,
    41,6,49,7,53,8
```

Intervals
by R Ginger

Snakes

on Spectrum

In this game two fast growing snakes compete for living space. Neither of them can touch anything, including themselves.

Variables

F = Score of Player One
G = Score of Player Two
B$ = Name of Player One
C$ = Name of Player Two
X,Y = Co-ordinates of Player One's Snake
W,Z = Co-ordinates of Player Two's Snake

To move make sure that *Caps Lock* is off

Player One		Player Two	
Up	w	Up	i
Down	z	Down	m
Left	e	Left	j
Right	s	Right	k

```
1.    REM GET PLAYERS NAMES, SET VARIABLES ETC.
2.    LET F = 0: LET G = 0: BORDER 5: POKE 23609, 200
3.    INPUT " WHAT IS PLAYER ONES NAME?"; B$: FOR N = 1
      PAUSE 10: NEXT N TO 16: PRINT INK 3; "SNAKES";:
4.    INPUT "WHAT IS PLAYER TWOS NAME?"; C$: FOR N =
       1 TO 16: PRINT INK 3; "SNAKES";:PAUSE 10: NEXT N
5.    PRINT B$; "HAS"; F; "WINS": FOR N = 1TO 16:
      PRINT INK 3; "SNAKES";: PAUSE 10: NEXT N
7.    PAUSE 75
8.    REM DRAW SCREEN
10.   CLS: PLOT 0,0.
11.   DRAW 0,175
12.   DRAW 255,0
13.   DRAW 0,-175
14.   DRAW -255,0
15.   LET X= 10: LET Y = 100: LET W = 220: LET Z = 10
20    POKE 23560,0
100.  REM DRAW SNAKES
110.  PLOT INK 4; X,Y: PLOT INK 3; W,Z
150.  LET B = X: LET C = Y: LET D = W: LET E = Z
200.  LET X = X + (PEEK 23560 = 115) - (PEEK 23560 = 97)
250.  LET Y = Y + (PEEK 23560 = 119) - (PEEK 23560 =122)
300.  LET W = W + (PEEK 23560 = 107) - (PEEK 23560 =106)
350.  LET Z = Z + (PEEK 23560 = 105) - (PEEK 23560 =109)
500.  IF B = X AND C = Y THEN GO TO 700
600.  IF POINT (X,Y) = 1 THEN GO TO 1000
700.  IF D = W AND E = Z THEN GO TO 100
800.  IF POINT (W,Z) = 1 THEN GO TO 2000
900.  GO TO 100
1000. CLS
1100. FOR M = 15 to 1 STEP-1
1150. BEEP .1, M: NEXT M.
1200. FOR M = 1 TO 15
1250. BEEP .1, M: NEXT M.
1300. PRINT "BAD LUCK "; B$; "YOU LOSE!!"
1400. PAUSE 100: LET G =G+1: GO TO 5
2000. CLS
2100. FOR M = 1TO 15
2150. BEEP .1, M: NEXT M
2200. FOR M = 15 TO 1 STEP -1
2250. BEEP .1, M: NEXT M
2300. PRINT "BAD LUCK"; C$; "YOU LOSE!!"
2400. PAUSE 100: LET F = F+1: GO TO 5
2500. STOP.
```

Snakes
by N Alchin

Organ

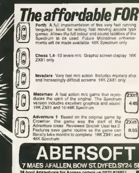
on Dragon 32

Dragon organ has been formed using Inkeys and Play Commands. It's similar to Music Trainer by Alan Blackham for the Vic20.

The program itself is simple, the notes to be played are Q W E R T Y U and they can be played in five octaves. Z = octave 2, 1, X = octave 2, C = octave 3, V = octave 4, B = octave 5

```
10   CLS
20   PRINT @ 130, "DRAGON ORGAN"
30   A$ = INKEY$: IF A$ = "" THEN 30
40   IF A$ = "Q" THEN PLAY "T2L20C": GOTO30
50   IF A$ = "2" THEN PLAY "T2L20C#": GOTO30
60   IF A$ = "W" THEN PLAY "T2L20D": GOTO30
70   IF A$ = "3" THEN PLAY "T2L20D#": GOTO30
80   IF A$ = "E" THEN PLAY "T2L20E": GOTO30
90   IF A$ = "R" THEN PLAY "T2L20F": GOTO30
100  IF A$ = "5" THEN PLAY "T2L20F#": GOTO30
110  IF A$ = "T" THEN PLAY "T2L20G": GOTO30
120  IF A$ = "6" THEN PLAY "T2L20G#": GOTO30
130  IF A$ = "Y" THEN PLAY "T2L20A": GOTO30
140  IF A$ = "7" THEN PLAY "T2L20A#": GOTO30
150  IF A$ = "U" THEN PLAY "T2L20B": GOTO30
160  IF A$ = "Z" THEN PLAY "O1": GOTO30
170  IF A$ = "X" THEN PLAY "O2": GOTO30
180  IF A$ = "C" THEN PLAY "O3": GOTO30
190  IF A$ = "V" THEN PLAY "O4": GOTO30
200  IF A$ = "B" THEN PLAY "O5": GOTO30
210  GOTO30
```

Organ
by P Watkins



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Lissajous Curves

on Spectrum

This program will run on the 16K Spectrum. It will draw a lissajous figure of a specified height and width, for any given number of loops with any given symmetry.

Variable list

a	Width of figure
b	Height of figure
n	Loop number
e	Symmetry
o	Angular displacement in rad
x	Plot coordinate
y	Plot coordinate
a$	Decision variable

```
  0>REM Lissajous Curve ©1983
 10 INPUT "Input Width ";a
 20 INPUT "Input Neight ",b
 30 INPUT "Input n ",n
 40 INPUT "Input e ";e
 50 PLOT 0,67  ORAW 175,0
 60 PLOT 87,0  ORAW 0,175
 70 LET c=.001  LET d=2*PI
 80 REN  ORAW LISSAJOUS CURVE
 90 FOR o=c TO d STEP .001
100 LET x=a*SIN (n*o+e)+67: LET
y=b*SIN o+67
110.PLOT x,y
120 NEXT o
130 PRINT AT 2,22,"Height.";b;A
T 4,22,"Width ·",a,AT 6,22,"n
 ",n,AT 8,22,"e      ",e
140 INPUT " COPY  C  STOP  :S
AGAIN  A  CLS FIRST :R ", LINE a
$
150 IF a$="c" TNEN COPY
160 IF a$="s" TMEN STOP
170 IF a$="a" TMEN GO TO 10
180 IF a$="r" THEN RUN
```

Height .79
Width ·79
n 3
e ·9

Lissajous Curves
by Andrew Murray

Skylander

on Vic20

This is a game in which you have to parachute from a plane and land on a ship. If you fail to do so you will be eaten by piranha fish.

To jump from the plane you press F1 and to steer yourself you use the keys A to move left and L to move right.

This program uses high resolution graphics and the computer should be turned off after use.

Program notes

1 9	Rem statements
10	Repeat on all keys routine
20 60	Data for high resolution graphics
60 110	High-res routine
88 210	Instructions
220-270	Moving ship line plane routine
400-530	Ending routine

```
1 REM*******************
2 REM*                 *
3 REM*  SKY LANDER     *
4 REM*                 *
5 REM*N.R.JAYAKUMAR    *
6 REM*                 *
7 REM*   2/12/82       *
8 REM*                 *
9 REM*******************
10 POKE650,128
20 DATA0,0,0.0,0,0,0,4
30 DATA0,0,128,224,252,255,174,252
40 DATA3,3,11,15,31,255,106,63
50 DATA15,24,156,255,255,136,24,16
60 FORI=0TO511
70 POKE7168+I,PEEK(32768+I) NEXT
80 FORI=0TO31 READJ POKE7168+I,J NEXT
110 POKE36879,8 PRINT "            SKY LANDER"
    PRINT "           PRESS ANY KEY"
136 GETA$ IFA$<>""THENPOKE36879,42 POKE36876,0
    GOTO140
125 IFA=7THENA=0
132 A=A+1 FORB=38550TO38570 POKEB,A FORC=1TO9
    NEXT NEXT GOTO120
140 FORA=1TO105 READA$ PRINTA$, FORB=1TO200 NEXT
150 DATA"  ",T,H,I S," I",S," A",  P",R,O,G,R,A,
    M,' I ,N,"  W',H,I,C,H," Y",O,U
160 DATA" H",A,V,E." T",O,"      PARACHUTE ",
    F,R,O,M," A ",P,L,A,N,E,"  ",N,D
170 DATA" L",A,N,D," ON ","A ",R,A,N,D,O,M,L,Y,"
    ",O,V,I,N,O," S",H,I,P,".
180 DATAT,O," D",O," T",H,I,S," U",S,E," -
    L ',T,O," M",O,V,E." A",I,O,H
190 DATA"          ",T,O," M",O,V,E," L",E,F,T,
    "       F 1 TO JUMP"
200 FORA=0TO7 FORB=38400TO38905 POKEB,A NEXT
210 POKE36869,255 PRINT"   FORA=38400TO38905
    POKEA,5 NEXT POKE36879,25
220 FORA=8164TO8185 POKEA,45 NEXT CLR
225 B=INT(RND(1)*21)+1
230 FORA=7680TO7701
235 D=INT(RND(1)*2)+1
236 IFD=1THENB=B-1
237 IFD=2THENB=B+1
238 IFB>20THENB=20
239 IFB<1THENB=1
240 GETA$ IFA$="@"THEN260
236 POKEA,3 POKE8142+B,2 POKE8143+B,1 FORC=1
    TO100 NEXT POKEA,32 POKE8142+B 32
255 POKE8143+B,32 NEXT GOTO230
260 H=A-7680 D=A+22 FORC=ATO7702
270 GETB$ IFB$="L"THEND=D+1 H=H+1
280 IFB$='A'THEND=D-1 H=H-1
285 IFH=0THENH=1 D=D+1
285 IFH=23THENH=21 D=D-1
296 POKEC,3 E=INT(RND(1)*2)+1 IFE=1THENB=B+1
300 IFE=2THENB=B-1
301 IFB>20THENB=20
302 IFB<1THENB=1
310 POKED,0 POKE8143+B,1 POKE8142+B,2
315 IFPEEK(D+22)=1ORPEEK(D)=2THEN400
320 FORT=1TO200 NEXT
330 POKEC,32 POKEB+8143,32 POKEB+8142,
    32 POKED,32 D=D+23
340 IFC<7701THENNEXT
350 IFD<8186THENGOTO270
360 FORA=1TO1000 NEXT PRINT"   POKE36858
    240 POKE36879,9 PRINT"    OH DEAR!!!!!!!!!!!
370 PRINT"YOU HAVE LANDED IN THE RED SEA AND
    HAVE BEEN EATEN BY PARANA FISH!"
380 GOTO500
400 FORA=1TO800 NEXT POKE36869,240 POKE36879,
    8 PRINT"                           !!!!!!!!1."
410 PRINT"YOU HAVE SUCCESFULY    LANDED....."
500 FORA=1TO1000 NEXT
510 PRINT"  WOULD YOU LIKE ANOTHER  GO" INPUTA$
    IFA$="YES'THENRUN210
520 IFA$<>'NO"THENPRINT'  I DO NOT UNDERSTAND
    PLEASE USE YES/NO" GOTO510
530 POKE36879,27 PRINT"         Y E   B Y E
    !!!!"
```

Skylander
by N M Jayckumat

Tony Bridge's Adventure Corner



Not as easy as it looks!

Adventure on microcomputers is generally represented by one of two types of program. There is first of all, the text adventure. This will consist of a screen of text which usually scrolls up as you input your commands to the computer. There are several ways in which authors present this kind of program, and we will examine some of them in the weeks ahead.

Graphic adventuring is the second type favoured by software authors, and the graphics themselves are usually one of two types. The more traditional approach — traditional depends of course on your outlook — is a display supported by text and your commands, while the other is pure arcade. The second type is gaining popularity along with the increasing sophistication of microcomputer graphics. As with text adventures, we shall have a good look at several different graphic adventures over the weeks.

The Atari microcomputer is probably the most successful at supporting games software of real arcade quality (although it had better not get too complacent — there are a lot of programmers, working on lowlier machines, eager to prove that statement wrong), and our program this week is written for the Atari by JV Software. *Ghost Encounters* and its sister program *Action Quest* are arcade adventures of the highest quality. Both written for 16K on cassette or disc, they are excellent value at £18.95.

There are five different levels, and you may start at any one. You have 10 lives. At first you are presented with the plan of a cosy little sitting room complete with TV and chairs. Four doors lead off this room into the unknown.

You control the ghost, which looks rather like a little newt. To enter a door you simply move on to it, and then you are in the chosen room. Somewhere within each room is treasure, but its position is not always apparent!

As soon as you enter a room, the clock starts ticking away, counting down the last two minutes of your present life, after which your ghost slowly fades away.

Each room presents a different hazard and a new challenge. In one, for instance, you may find that your *alter ego*, the ghost, has to run a gauntlet of bullets to reach the treasure. In another way, you have to ease your way through a winding corridor — if you touch a wall you are transported out of the room and back to the start.

Your troubles are only just starting, however (wouldn't you know it!), as the treasure is usually protected by ferocious little guardians who will not hesitate to get it back from you. At this point, you may very cleverly turn yourself into a gun and shoot at them. The only problem with standard joysticks is that you can very quickly get the dreaded joystick thumb, in which your thumb hangs uselessly, red and aching!

Each room has a title, which should give you a clue as to how you are going to get beaten this time — for example, one is called *Speedy Little Devils*, and once the guardians appear you have to move fast! Another is called *Not As Easy As It Looks*, and so on, through the five levels. Thus, the adventure stands up to repeated playings, because some of the rooms will not give up their secrets easily. After losing your 10 lives, a ranking is awarded you, from *Hopeless* upwards (I cannot tell you what the higher ones are!)

As you can see, this adventure retains some of the original thought behind the game, that is, solving a series of riddles which take you to higher levels. Much of the time the treasure requires a special, obscure, technique to release it from the room. In one location, for instance, it sits innocently and quietly on a little table, waiting to be picked up. As soon as you touch it, however, two walls rush together and crush you! There is a way to prevent this happening, but it is a frustrating puzzle.

The arcade part of the game is good, too, thus giving a balance between all the elements. In a future week, we'll look at a more traditional adventure program for the Atari. In the meantime, keep your letters coming in and *Cuddle up to a Balrog!* ■

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to Tony Bridge, Adventure Corner, *Popular Computing Weekly*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.

Hobbit Winner

Who will be first to complete The Hobbit?

John Hardman of Welling, Kent, has won our *Hobbit* competition. His entry, containing a short message which appears on the screen when you have completed 100 percent of *The Hobbit*, was the first correct solution received at *Popular Computing Weekly*. P Rawlinson of Liverpool and Malcolm Prescott of South Harrow tied for second place.

For those of you who have not yet completed *The Hobbit*, John Hardman has written the following notes.

The Hobbit is a demanding adventure requiring ingenuity to overcome the many problems encountered. Even the advice given in the instruction booklet can be misleading — suggesting, for instance, that you should protect Thorin the dwarf. In fact, it appears that Thorin is only needed to provide you with an escape route from the Goblin's dungeon. So, it is advisable to leave him there.

If you do take Thorin with you, he becomes a liability, particularly when trying to escape from the Misty Mountains.

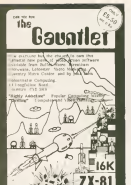
The program also appears to contain red herrings and even kindness is not rewarded by the creatures you may meet. If you stop to talk to Gollum, you risk being strangled and being seen by the butler will lead to you being thrown into a dungeon.

Some creatures have to be killed on sight, the most obvious example being the dragon who will roast you with his fiery breath if provoked. Enlisting the help of Bard the archer will normally solve that problem. However, Bard only has one arrow, and he can miss!

Once the treasure has been stolen, the biggest difficulty you will encounter is that of returning as far as Beorn's house. The only route I have discovered is via the wood elf's dungeon, so try not to kill him until you are out of the forest.

Cruising challenge

The highest score sent in so far this month is 7602 from Gary Webley, 16 The Close, Chequer Field, Pontefract, West Yorkshire.


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Now everyone has the chance to own this fantastic new piece of video action software available from Buffer Micro Streatham, Software, Leicester Micro Marketing, Coventry Micro Centre and by post from
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"Highly Addictive" Popular Computing Weekly
"Thrilling" Computer and Video Games
16K
ZX-81

Scotched!

Calvin Woodings presents a statistics program for the BBC A and B on averages

You are a Trading Standards officer and have to investigate a complaint that an off-licence is selling incompletely filled bottles of Scotch. You buy ten bottles and measure their contents very carefully. The results in millilitres are 1001 1020 1004, 1007 1003, 1009, 1000 1003 1010, 1015

All the bottles are thus found to contain more than the volume stated on the label (i.e. 1 litre), so was the person who lodged the complaint mistaken, or is there a case for taking the matter further?

The following program, written for the BBC Micro would certainly help. When *Run* the first thing it asks for after leaving the title page is the maximum number of results to be entered. Your response is used to dimension an array at Line 460 and should be between 2 and 999

Clearly 10 is an appropriate input here if you only intend to do this one calculation. Next you have to enter the results one at a time until the array full prompt appears after the 10th entry. (If you chose a number of results above 10 then typing '00 when asked for result 11 will tell the computer you have finished.) You now have the option to correct any mistakes by choosing to 'See and edit the data'

When any mistakes have been corrected you are asked to select the number of decimal places you require the display to use. In this example two would be an appropriate choice. After a moment's hesitation the screen fills with an analysis of the data entered (Fig 1)

The first six items could, in this elementary case, have been obtained quite easily with a paper and pencil. However the estimate of the standard deviation of the population is less easy to obtain, and is the key to the decision you are trying to make here. It is an estimate of the spread of volumes of Scotch in bottles of the brand sampled

If you feel that 95 out of every 100 bottles should reasonably be expected to contain more than the volume declared on the label, then these figures give cause for concern. The analysis suggests that 95% of the contents in the brand could vary from 994 35 to 1020 05 mls and that you could therefore predict short measure in more than 5 bottles out of every 100

In practise, you would probably only use this conclusion to warn the manufacturer that his bottle filling was looking too variable

Program notes

The program is well structured and should be relatively easy to extend if required. Some of the procedures are of general interest and could be *Spooled* to a separate tape for use in future programs

PROCs 'title and 'double height' control the title page, with line 210 centering the text

DEFFNyes-no controls the formatting of the option questions, with x being the parameter which defines the TAB and A$ being the string printed

PROCdata-load controls the input and the use of EVAL with string input enables expressions to be taken in and evaluated

FNinput controls the input accepted from the keyboard. The parameters restrict the number of keys which can be pressed (1en) and the range of Ascii codes for the characters to be accepted (loASC to hiASC)

PROCs 'review and 'change enable mistakes to be corrected prior to calcuation

PROCcalculate performs the arithmetic and prints out the results. The variance calculated at line 1040 is the best estimate of the population variance as predicted by the sample variance. If your data was in fact the entire population, line 1040 should be altered to

1040 variance=v/K

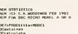
However, the difference between K (the number of results) and K-1 is really quite small when a reasonable quantity of data is being analysed, and the alteration may not often be needed

The conclusions displayed refer to a normally distributed population. This simply means that the results should tend to be evenly distributed around a centrally situated mean value. If, for instance, the analysis showed that the average value was very much closer to the highest or lowest result than it was to the middle of the range, then the data would be biased and the standard deviation would not be a valid measure of its spread

To run on Model A, use Mode 4 at line 50 and omit the colour definitions at lines 80, 420, 440, 670, 680, 880, 930, 1060, 1070, 1150, 1190 ■

```
ANALYSIS
Number of results        =  10 00
Lowest Result            =  1000 00
Highest Result           =  1020 00
Sum of results           =  10072 00
Range of results         =  20 00
Average                  =  1007 20
Standard Deviation       =  6 43
Variance                 =  41 29
If the data was free from bias and from a
normally distributed population then the
following can be concluded
68% of the population should be between
  1000 77 and 1013 63
95% of the population should be between
  994 35 and 1020 05
          Another run (Y/N) ? N
Bye!
```

Figure 1



```
10   REM STATISTICS
20   REM (C) C R WOODINGS FEB 1983
30   REM FOR BBC MICRO MODEL A OR B
40
50 MODE7:PROCtitle:MODE1
60 PROCdataload
70 PROCcalculate
80 COLOUR 3
90 IF NOT FNyes_no(10,"Another run")
   THEN 110
100 CLS:RUN
110 PRINT"Bye!"
120 END
130
140 DEFPROCtitle
150   PROCdouble_height(8,"STATISTICS",132)
160   PROCdouble_height(12,"'On the Average "
   ,131)
170   PROCcontinue
180 ENDPROC
190
200 DEFPROCdouble_height(row,words$,colour)
210   column=INT((40-LEN(words$))/2)-2
220   FOR I=row TO row+1:PRINTTAB(column,I);
   CHR$141;CHR$colour;words$
230   NEXT
240 ENDPROC
250
260 DEFFNyes no(x,A$)
270   LOCAL ans
280   PRINT
290   PRINTTAB(x)A$;" (Y/N) ? ";
300   REPEAT
310   ans=(GET AND &DF)
320   UNTIL ans=&59 OR ans=&4E
330   PRINTCHR$ans
340 =(CHR$ans="Y")
350
360 DEFPROCcontinue
370   PRINTTAB(7,23)"Press any key to
   continue ";
380   REPEATUNTILGET
390 ENDPROC
400
410 DEFPROCdataload
420   CLS:COLOUR 1:PRINTTAB(14,2)"DATA
   LOADING:"
430   PRINTTAB(2 4)"Expressions are accepted
   : End with 00"
440   COLOUR 3:VDU28,0,31,39,6:K=1
```

Turn to page 31

From page 29

```
450   PRINTTAB(9)"Max. no of results ? ";
460   array=VAL FNinput(3,39,58):DIM data
      (array):PRINT:PRINT
470   REPEAT
480   data$=""
490   PRINTTAB(12)"RESULT ";K;" = ";
500   data$=FNinput(12,39,58):PRINT
510   data(K)=EVAL data$:K=K+1
520   IF K>array THEN PRINTTAB(10)"Array
      full":PROCcontinue:K=K-1:GOTO540
530   UNTIL LEFT$(data$,2)="00":K=K-2
540   IF FNyes_no(10,"See and edit")
      THEN PROCreview
550 ENDPROC
560
570 DEFFNinput(len,loASC,hiASC)
580   LOCAL K%,Z%:K%=0:In$=""
590   REPEAT
600   Z%=GET
610   IF Z%=127 AND K%>0 THEN K%=K%-1:In$=
      LEFT$(In$,K%):VDUZ%
620   IF Z%>loASC AND K%<len AND Z%<hiASC
      THEN K%=K%+1:In$=In$+CHR$Z%:VDUZ%
630   UNTIL Z%=13 AND K%>0
640 =In$
650
660 DEFPROCreview
670   VDU26:CLS:COLOUR 2:PRINTTAB(14,2)"DATA
      EDITING"
680   COLOUR 3:VDU28,0,31,39,6:L=0
690   REPEAT
700   CLS:FOR N=1 TO 10
710   IF N+L=K+1 THEN 740
720   PRINTTAB(12)"RESULT ";N+L;" = ";
      data(N+L)
730   NEXT
740   IF FNyes_no(10,"Change an entry")
      THEN PROCchange:GOTO740
750   L=L+10
760   UNTIL N+L-11=K
770   IF FNyes_no(10,"Another look")
      THEN PROCreview
780 ENDPROC
790
800 DEFPROCchange
810   PRINTTAB(12)"Which number ?";
820   N=VAL FNinput(3,47,58):PRINT
830   PRINTTAB(12)"New value ?";
840   data(N)=EVAL FNinput(12,39,58)
850 ENDPROC
860
870 DEFPROCcalculate
880   VDU26:COLOUR 2
890   CLS:PRINTTAB(4,14) How many decimal
      places (1-9) ? ";
900   places=VAL FNinput(1,48,58)
910   @%=&02000A+256*places:REM sets print
      format
920   CLS:PRINTTAB(16,14)"computing"
930   COLOUR 3
940   sum=0:v=0:min=1.0E20:max=0
950   FOR N%=1 TO k
960   IF data(N%)>max THEN max=data(N%)
970   IF data(N%)<min THEN min=data(N%)
980   sum=sum+data(N%)
990   NEXT
1000  mean=sum/k
1010  FOR N%=1 TO k
1020  v=v+(data(N%)-mean)^2
1030  NEXT
1040  variance=v/(k-1)
1050  std dev=SQRvariance
1060  CLS:COLOUR 2:PRINTTAB(17,1)"ANALYSIS"
1070  COLOUR 3:PRINTTAB(5,3)"Number of
      results";TAB(19);" = ";k
1080  PRINTTAB(5,5) Lowest Result";TAB(19);
      " = ";min
1090  PRINTTAB(5,7)"Highest Result"
      ;TAB(19);" = ";max
1100  PRINTTAB(5,9)"Sum of results"
      ;TAB(19);" = ";sum
1110  PRINTTAB(5,11)"Range of results";TAB
      (19);" = ";max-min
1120  PRINTTAB(5,13)"Average";TAB(19);" =
      ";mean
1130  PRINTTAB(5,15)"Standard Deviation";
      TAB(19);" = ";std dev
1140  PRINTTAB(5,17)"Variance";TAB(19);" = ";
      variance
1150  COLOUR 1
1160  PRINTTAB(1,19)"If the data was free
      from bias and"
1170  PRINT"from a Normally distributed
      population"
1180  PRINT"then the following can be
      concluded."
1190  COLOUR 2
1200  PRINT "68% of the population should be
      between"
1210  PRINTmean-std dev;" and ";mean+std dev
1220  PRINT "95% of the population should be
      between"
1230  PRINTmean-std dev*2;" and ";mean+std dev*2
1240  @%=10:REM resets default print format
1250 ENDPROC
```

Cleared for take-off!

***M Twigger** presents a fast, partial screen clearance routine for the Dragon 32.*

On occasions where part of the high-resolution screen needs to be cleared, *Put*, *Get* or *Paint* can be used However for anything other than small areas of the screen they are not very quick I wrote this program for clearing the windscreen on a flight simulation program I have been working on

The short machine code routine in this program clears a box on the screen top left corner *C1 R1* and bottom right *C2 R2* specified in high resolution co-ordinates The program is for *Pmode 4* but it can be adapted to other hi-res modes As well as clearing a box, it can also fill a box with a pattern of vertical stripes or draw horizontal dotted lines

You are asked to provide the co-ordinates of the box to be cleared This box is drawn to show up the actual cleared area Press any key to clear the box, and then again to repeat the process with new co-ordinates

Lines	
10-60	Reads in the machine program The *Clear* instruction defines the top of the Basic area, machine code starting in the next memory address *S=* the address appearing in the *Clear* instruction
100 110	Gets box corners
120	Calls the subroutine to calculate byte values to be *Poked* It is needed each time the box dimensions are changed
130	Ensures that the box contains at least one byte
200-240	Draws on screen for comparison
300	Executes the machine code program to clear box
500-590	Subroutine to *Poke* box dimensions into machine code program The 1536 in Lines 510 and 520 is the start of the graphics page 1

By changing the first byte (*255*) in the machine code patterns can be placed in the box area. In *Pmode 4* each of the bits of the 8-bit byte represent one pixel, *'0* is black *1* is green/buff depending on which screen is deing used Thus altering this byte to *'170* produces a dotted line pattern because *170* is *'10101010* binary To change the byte *Poke ST 1 170*

For *Pmode 3* the same program will work but the meaning of the first byte differs It now represents four pixels with binary coding as follows

code	screen 0	screen 1
00	green	buff
01	yellow	cyan
10	blue	magenta
11	red	orange

Thus the first byte for a yellow/blue alternating stripe pattern is binary *01 10 01 10*, which has a value of 102 To use the routine in your program, use lines 10-60 to initialise call the subroutine 500-590 each time you set new box co-ordinates and use line 300 for each clearance

The only drawback is that the program has to round the *X* co-ordinate to a multiple of 8 This is because the screen information is stored in 8-bit bytes across a row This is done by line 130 and lines 510-530 The cleared box may therefore be smaller than expected ■

```
10 CLEAR 100,32700:S=32700:ST=S+7: PMODE 4,1
20 DATA 255,166,140,252,16,174,140,244,31,33
   ,95,167,132,92,225,140,234,34,4,48,1,32
   ,244,49,168,32,16,172,140,224,37,232,57,-1
40 READ X
50 IF X=-1 THEN 70
60 POKE S+6,X: S=S+1: GOTO 40
70 REM-INITIAL DATA READ IN. POKE CHANGES NOW.
100 INPUT"I/P TOP LEFT CORNER X,Y";C1,R1
110 INPUT"I/P BOTTOM RIGHT CORNER X,Y";C2,R2
120 GOSUB 500
130 IF W<1 THEN 100
200 PCLS:SCREEN 1,0: REM-DRAW BOX EDGES FOR DEMO
210 LINE(C1,0)-(C1,190),PSET
220 LINE(C2,0)-(C2,190),PSET
230 LINE(0,R1)-(255,R1),PSET
240 LINE(0,R2)-(255,R2),PSET
260 IF INKEY$="" THEN 260
300 EXEC ST:REM-USE MACHINE CODE TO CLEAR BOX
400 IF INKEY$="" THEN 400 ELSE 100
500 REM-SUBROUTINE TO POKE BOX DIMENSIONS
510 S1=1536+32*R1+INT((C1-1)/8)+1
520 S2=1536+32*(R2-1)+INT((C2+1)/8)-1
530 W=INT((C2+1)/8)-INT((C1-1)/8)-2
535 IF W<1 THEN RETURN
540 POKE ST-6,W
545 H1$=HEX$(S1):H2$=HEX$(S2)
546 IF LEN(H1$)<4 THEN H1$="0"+H1$
547 IF LEN(H2$)<4 THEN H2$="0"+H2$
550 POKE ST-5,VAL("&H"+LEFT$(H1$,2))
560 POKE ST-4,VAL("&H"+RIGHT$(H1$,2))
570 POKE ST-3,VAL("&H"+LEFT$(H2$,2))
580 POKE ST-2,VAL("&H"+RIGHT$(H2$,2))
590 RETURN
```

Loaded Up!

***Deborah Annette** presents a m/c loader and a keyboard controller for Spectrum*

Machine Code Loader

This particular routine is included for the machine code beginner who has heard what machine code can do and wishes to try it. It provides a step by step procedure for entering a machine code program and running it — enabling the beginner to use the ensuing machine code subroutines without needing to understand how they work. All the subroutines, which include keyboard, sound and print controllers are *Loaded* using the same techniques described below.

For those who are already conversant with machine code, then the remainder of the series will save you the trouble of delving around the Rom trying to find those elusive calls.

To demonstrate a very simple example of *Loading* machine code, enter the Basic program in Figure 1. The following technique is used to load the machine code program on page 179 of your Sinclair manual

```
ld bc 99
ret
```

which translates to the machine code

```
1 99 0
201
```

and is entered by typing the following

General Comments			Remarks
Start loader			
RUN	100	ENTER	Run Basic m/c loader
Enter m/c	1	ENTER	Code equivalent to 1d
	99	ENTER	this is c. The only number
	0	ENTER	& this is b. you can change
	201	ENTER	RETURN TO BASIC
Stop loader	r	ENTER	EXIT FROM LOADER
Run m/c	*RUN*	ENTER	RUN THE M C

r enter will produce a warning message

2 variable not found, 100:3

to say that we have exited from the loader. Figure 2 gives an indication of what the screen should look like while entering the machine code.

You can alter the values of *b* and *c* which must be within the range of 0 to 255. The value printed on the screen when the machine code is Run will be *c* + *(256 • b)* — ie *RUN 100 / 1 / 5 / 2 / 201 / r* D *RUN* where / is *enter* will print an answer of 517 which is 5 + (256 • 2)

Keyboard Controller

The *RST 56* function scans the keyboard and places the last key pressed into address *23560*. To program the computer so that it will only respond to a given range of key entries use the following — using the machine code loader from Figure 1

RST 56	255	Put last key pressed
LD A (NN)	58 8 92	into address 23560
CP N	254 97	Compare with a
jp c DIS	56 248	look for another key if less
CP N	254 105	Compare with i
jp NC DIS	48 244	look for another key if equal or larger
RET	201	return to Basic

This tests for a key within the range *a* to *h*, no other key is operative — even the break key is disabled. The routine can be modified in the following way to permit only a single key entry, *w* — all others being ignored

RST 56	255	Put last key pressed
LD A (NN)	58 8 92	into address 23560
CP N	254 119	Compare with w
jp NZ DIS	32 248	No try again
RET	201	Return to Basic

These very short routines are useful in restricting key entries. By the way, there is an error in the keyboard decoding routine

GRAPHIC V — RND	GRAPHIC W — INKEY $
GRAPHIC X — PI	GRAPHIC Y — FN
GRAPHIC Z — POINT	CODES 165 to 169

They should not return an entry as these functions are located at other positions on the keyboard (some requiring additional key depressions)

Machine Code Loader

```
    1 REM xxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxx
   10 PRINT   RANDOMIZE USR 23760
   STOP
  100 FOR a=23760 TO 23855  PRINT
   a;"  ",  INPUT b  POKE a,b  PRI
NT PEEK a  NEXT a  STOP
```

Fig 1

Type RUN 100	to load machine code
Type r	to exit from loader
and RUN	to test code

(See Brief No 1)

```
23760   1
23761   99
23762   0
23763   201
23764
```

Fig 2

Next. The Sound Controller

PARADE

This short entertaining program for the Spectrum indicates many of its superior merits over the ZX81.

When *Run* the soldiers march on parade, the flag is raised and the first verse of the National Anthem is played.

```
   REM "  "
 100 PLOT 16,30  DRAW 238,0  PLO
T 30,30  DRAW 0,132
 110 GO SUB 300
 120 FOR x=10 TO 3 STEP -1  PRIN
T AT x,8;"  "  FOR n=1 TO 30  NEX
T n  PRINT AT x,8;"     NEXT x
 140 PLOT 30,160  DRAW 40,0  DRA
W 0,-20  DRAW -40,0  DRAW 40,20
 150 PLOT 70,140  DRAW -40,20  P
LOT 52,160  DRAW 0,-20  PLOT 30
150  DRAW 40,0
 160 PRINT AT 3,18;"God save our
",AT 4,18;"gracious Queen",AT 5,
18;"Long live our",AT 6,18;"nobl
e Queen",AT 7,18;"God save our",
AT 8,18;"Queen"
```

```
 200 FOR i=1 TO 16
 210 READ a,b  BEEP a,b  NEXT i
 220 DATA 1,0,1,0,1,0,1.5,2,.5,-1,1,0
,1,2,1,4,1,4,1,5,1.5,4,.5,2,1,0
,1,2,1,0,1,-1,1,0
 250 STOP
 300 LET x=230
 400 FOR j=1 TO 12
 500 PLOT x,58  DRAW 0,20  DRAW
4,0  DRAW 0,-20  DRAW -4,0
 510 PLOT x-6,80  DRAW 12,20
 520 PLOT x+7,80  DRAW 0,24  DRA
W 0,10
 530 PLOT x-2,50  DRAW 2,10  DRA
W 2,-8
 540 CIRCLE x+4,77,4
 550 PLOT x,80  DRAW 2,7  DRAW 2
,-7  DRAW 0,0
 560 LET x=x-18
 570 NEXT j
 580 RETURN
```

```
God save our
gracious Queen
Long live our
noble Queen
God save our
Queen
```

Parade

by

Y Barrington

Aim, Fire!

Keith and Steven Brain *present part 3 of their series — how to add graphics to your own Dragon games*

Now that we have got some graphics into our game let's think about getting a more precise response to the appearance of the figure in Firing Line

Making ten aiming points

Last time the Print Position was determined by B=RND(30)+255 which meant that it could be at any one of 30 points on line 9 Let's alter that so that there are now only 10 different positions which we can then match with keys 0 to 9

Picking a number between 0 and 9 is more awkward than just choosing a positive number as the *Rnd*(X) function returns a value between 1 and X The solution is simply to pick from a number one higher than the highest number you want and then subtract 1 from the result of *Rnd*(X)

```
P=RND(10)-1
```

To spread these ten points evenly across the screen we need to multiply this number by 3 so that they are spaced out three screen print positions apart

```
P=(RND(10)-1)*3
```

> There was one small mistake in last week's Dragon page Line 1010 in the Firing Line program should have been numbered line 150 The program will still work as it was originally printed, but the score will be wrong

Finally we can centralise the display by adding +256 to make the new line 110

```
110 P=(RND(10)-1) B=(P*3)+256
    SOUND255 1 GOSUB1000
```

Checking for a hit

The next thing to consider is altering the 'consequences of key press' to introduce a check that the key corresponding to the current figure position has been pressed This needs to compare the print position (B) with the key pressed (A$) You can't compare string and simple variables directly so we must either convert B into a string variable or A$ into a simple variable You can use either

```
130 IF A$ = "" THEN NEXT AK = VAL(A$) IF AK
    <> P THEN SOUND 15 10:D=D+
    INT(RND(0)) GOTO50 ELSE SOUND 150 5
    GOTO50
```

or

```
130 IF A$ = "" THEN NEXT IF A$ <> STR$(P)
    THEN SOUND 15 10 D = D + INT(RND(0))
    GOTO50 ELSE SOUND 150 5 GOTO50
```

Having to hit the exact key now makes life much more difficult. If you are really in trouble you can always add this 'training' option where the number of the key is also shown above the figure

```
1025 PRINT@(B-32) (B-256)/3
```

You will probably also need to give yourself more time to react, so think about line 120 again

Computer encounters of the second kind

By now you probably think your reactions are very fast — so let's set up a second test situation where you have to follow a sequence of numbers to bring you down to earth again To start with we will just pick random numbers (1-7), display them and expect you to press the corresponding key If you get it right you get two numbers to repeat, and so on so that the sequence gets longer and longer and more difficult to copy

The first things to do are to make an empty string to work with, to set up a completely black screen, and to choose a number between 1 and 7

```
10 A$ = ""
20 CLS0
30 A = RND(7)
```

As you have already seen we must convert A with *Str$* to use it as a string variable but in this case there is another slight problem in that *Str$* always gives you a string variable with more than one character in it, which makes life complicated when you try to slice the string

The easy way out of that problem is to throw away everything except the last character in the string produced by *Str$* by taking only '*Right$*(*Str$*(A),1)' We can then add the new random number to the end of the old A$ to give a new longer A$, and print the whole string out.

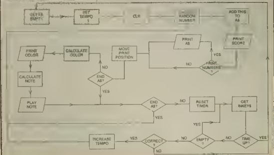
```
40 A$ = A$ + RIGHT$(STR$(A) 1)
70 PRINT@256 A$
```

The test for correct response is a little tricky as *Inkey$* can only enter one character at a time whilst we need to repeat a sequence We must look at each character in the string in turn by *Mid$*(A$ N 1) and compare it with the next *Inkey$*

```
160 FORN=1TOLEN(A$)
(from the first to the last character in A$)
180 B$ = INKEY$
200 IFB$ = "" THEN180
210 IFB$<>MID$(A$ N 1)THEN10
(compare INKEY$ with the next character in A$)
230 NEXT
240 GOTO20
```

If you find that too easy you can add a time limit for pressing a key each time

```
170 TIMER = 0
190 IFTIMER > 100THEN10
```



Alternatively you can set an overall time limit taking into account the length of the string, but you must then remember to swop the positions of lines 160 and 170 so that the timer is not reset for each character

```
160 TIMER = 0
170 FORN = 1TOLEN(A$)
190 IFTIMER > (LEN(A$)*30)THEN10
```

As usual it's getting hard to keep track so let's display the score which is simply one less than the length of A$

```
50 PRINT@0 "SCORE" (LEN(A$) - 1)
```

Watching numbers is rather dull so what about adding a little colour? We can slice the string into single numbers (C$) as before, but to convert these to low-resolution graphic blocks we need to go back to a simple variable by C = *Val*(C$). If you remember that the different coloured graphic blocks have codes 16 apart starting at *Chr$*(143), line 120 should be clear

```
90 FORM = 1TOLEN(A$)
100 C$ = MID$(A$ M 1)
110 C = VAL(C$)
120 PRINTCHR$(143 + 16*(C - 1))
150 NEXT
```

All we need to do now is to get them to print under the appropriate number by moving the print position on after printing A$

```
80 PRINT@288
```

If flashing lights aren't good enough then what about a bit of music? In this case the numbers 1 to 7 must be converted to the letters A to G to put into a *Play* command. This is not too hard if you take the Ascii value of the number and add 16 to it to give the Ascii values of those letters. If you can't see how that works have another look at the Ascii code table

```
130 D = ASC(C$) + 16
140 PLAY CHR$(D)
```

To make it more interesting we can change the tempo as your string gets longer by increasing T every time you are correct (line 220), and changing line 140 to take account of the tempo status but you must first set T=1 in line 10 or your program will crash the first time through as tempo 0 is invalid!

```
10 A$ = "" T = 1
140 PLAY "T" + STR$(T) + CHR$(D)
220 T = T + 1
```

Finally to impress your friends we will add in a title sequence in which you can choose whether to display both numbers and colours or colours alone. A sequence of notes (which we are sure we have heard before somewhere) has been added together with a moving display sequence of numbers and colours. Line 1120 checks for *Inkey$* and if this is not "Y" or "N" then 1220 repeats the moving display. If you press "Y" or "N" the game starts but you must add

```
60 IFQ$ = "N"THEN80
```

to jump over the number printing section if Q$ = "N" ■

```
1 GOTO1000
10 A$="" T=1
20 CLS0
30 A=RND(7)
40 A$=A$+RIGHT$(STR$(A) 1)
50 PRINT@0,"SCORE" (LEN(A$)-1);
60 IFQ$="N"THEN80
70 PRINT@256,A$
80 PRINT@288,"";
90 FORM=1TOLEN(A$)
100 C$=MID$(A$ M,1)
110 C=VAL(C$)
120 PRINTCHR$(143+16*(C-1))
130 D=ASC(C$)+16
140 PLAY"T"+STR$(T)+CHR$(D)
150 NEXT
160 FORN=1TOLEN(A$)
170 TIMER=0
180 B$=INKEY$
190 IFTIMER>100THEN100
200 IFB$=""THEN180
210 IFB$<>MID$(A$ N,1)THEN100
220 T=T+1
230 NEXT
240 GOTO20
1000 REM TITLE SEQUENCE
1010 N$="1234567"
1020 P$="GDBDG"
1030 CLS0
1040 PRINT@38,"COMPUTER ENCOUNTERS";
1050 PLAY"GDBDL2G"
1060 PRINT@70,"-OF THE SECOND KIND";
1070 PLAY"L5GDBDL3G"
1080 PRINT@134,"FOLLOW THE SEQUENCE"
1090 PLAY"L6GDBDL4G"
1100 PRINT@230,"DO YOU WANT TO SEE";
1110 PRINT@288,"BOTH NUMBERS AND COLOURS (Y/N)?"
1120 Q$=INKEY$
1130 FORN=1TO5
1140 PRINT@(334+32*N),"  "
1150 FORM=1TO1000
1160 NEXT
1170 PRINT@(334+32*N),MID$(N$,N,1);
1180 R$=MID$(P$,N,1)
1190 PRINTCHR$(143+16*(N-1));
1200 PLAYR$+"P50"
1210 NEXT
1220 IFQ$<>"Y"ANDQ$<>"N"THEN1200
1230 GOTO10
```

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VIC20 plus cassette drive software and Introduction to Basic Part 1 £180 ono Tel 01 862 5786

VIC20 COMMODORE, 8K Ram pack, £40 M Valantine 101A Underdale Road Monkmoor Shrewsbury Shropshire SY2 5EF

CBM 64 + c2n cassette deck, mint condition PRG + software £360 Tel 01-747 0990 evenings 01-995 1441 ext 4892 daytime Mr Quigley

VIC20, boxed computer + cassette unit, dust covers, 8K Ram boxed as new £149 Tel 0602 703604 after 6 pm

VIC20 16K cassette unit joystick covers, 0 Level cassettes + £100 software cost over £400 will accept £330 ono Tel 021-458 7682

VIC20 Adv the Count, swap for Mission Impossible + Time Machine for Golden Baton Tel 01 902 4397 (6 pm)

COMMODORE 64 + C2N cassette unit, only one month old, unused still in original box bought for £389 want £350 ono Tel 0740 747641 (eves)

SPECIAL VIC20 with 8K Internal Ram screen addressable to 1024 + 8K expansion + H Res. Rom + books also extras £250 ono Tel 061-431 3563

VIC20 Adventure Land + Mission Impossible Swap for any other adventure Tel 01-853 7320

VIC20, Pinot Cave cartridge swap for other in series Tel 0793 36829

NEW COMMODORE, 16K Rampack Defender Vic Panic Chess Space Invaders Orb Star Trek, £80 Tel 0606 75118 after 6 pm

VIC20 + cassette unit, 3K Ram super expander joystick, £80 software + books very good condition £175 Tel Portsmouth 753286

VIC20, tape unit 3K SE books software £70 joystick cost £360+ accept £200 ono Tel Brighton (0273) 606066 (5 pm)

VIC20 with cassette unit joystick, Introduction to Basic Part I real cartridges + four cassette games, three books with programmable games etc worth £290 sell for £180 Derby 368537

VIC20 + tape cassettes £158 one month s/a Tel 01-804 6780 after 6 pm

VIC20, cassette + accessories exchange for Pentax MV Super load of accessories worth £400 Tel Harlow 412822 before 8 30 pm

SWAP VIC20 cartridge Voodoo Castle for The Count Tel 01-805 4641 (6 pm)

SWOP my new Commodore 64 for your s/e Apple 2 Tel Hemel Hempstead 68141 (eves)

PET 3032 32K 3040 dual drive floppy disc cassette drive and leads £500 Tel 0275 812270

VIC20 one month old perfect condition with £20-worth games £110 ono Tel 0224 733101 after 5 pm (Aberdeen)

VIC20, 8K, Joystick lots of software two months s/a £210 ono Tel Malbern 52299

VIC20 plus cassette unit, 8K joystick, book dust cover £80 software including two revision packs Vicman etc, £180 Tel Blackburn 55368

THREE VIC20 CARTRIDGES, £45 Tel Newark 706326

VIC20, cassette unit Afrom exp 2K extra Ram £75 books £125 cartridges £100 cassettes as new £500 ono Tel 01-642 8324

VIC20 cassette unit, 3K super exp four cartridges lots of cassettes joystick, two books £330 ono Tel Stourport on Severn 6102

VIC20 plus 8K C2N cassette unit, M/C HR cartridge five games cartridge joystick, £220 ono Tel Coventry 467703

VIC20 plus cassette recorder Telly simulators Intro to Basic and others £150 Tel Southend 525486

VIC20, cassette unit, super expander cartridge one joystick three games cartridges and Programmers Reference Guide £180 Tel Huntingdon (0480) 215557 evenings

VIC20, complete with memory expansion board + 3K C2N cassette recorder £2 cartridge games + many books and cassettes, £250 ono Tel 01-853 0021

VIC 8K Ram cartridge £30 Defender £5 Sidewinder £5 Scramble £4 Tel 061 440 2124

VIC 20 plus cassette unit, plus 11K stack skiraboard £50 of software joysticks and books £200 ono Tel Polgate 2295 after 4 30 pm

VIC20 + 16K Ram cassette player joystick, 10 cartridges + cassette games + numerous books £200 ono Tel Guildford 586K1 (after 2 pm)

VIC20 swap Grid Runner Space Fortress Backgammon for other games Tel Stevenage 61788 John

CBM PET, 32K upgraded 2001 + cassette deck IEEE Serial Cable £300 Tel 01 581 5579

VIC20 software to swap or sell Also cartridge to swap for cassette software Tel 01-367 8751

PET 32K large keyboard basic 4.0 toolkit, superchip — Reset, C2N cassette manuals Hampshire books 70 mags software tapes/blanks 3022 printer cables £800 ono will split 01-679 9628

SWAP VIC20 SOFTWARE. Tel 01-458 4562

CBM 4032 COMPUTER, cassette 40 40 disks built in reset + Centronics interface Basics 4 + 2 add-on Roms Visicalc Wordcraft Petspeed all manuals + many books £1 200 Tel Hereford 273047

CBM 64 new + tape unit one month old 2 year guarantee little used good condition £385 ono Tel Mondays to Fridays 4 pm to 10 pm or Saturdays and Sundays 12 pm to 10 pm Robert Wells (0740) 74784

VIC CARTRIDGE Voodoo Castle £15 Also 8K Ram £22 Tel 0962 53240 (eves)

SWAP COMMODORE PET 8K MOTHERBOARD new Rams all in order minus Roms for 8K all Rams plus Vision III Roms preferably in order Tel Sheffield 463687 6 pm to 8 pm

GOT DIFFICULTY IN GETTING YOUR TAPES? Well need a Farnham Portsmouth and Gosport ZX Spectrum Club Tel Farnham 235929

SWAP COMMODORE CARTRIDGE Star Battle for Gorf or Mission Impossible Tel 061 790 8458

Tandys for sale

32K Model 1 Level 2 TRS80 plus £100 games, utilities plus £50 literature VDU cassette recorder/soundbox only £449 ono Part exchange available 061 742 1486 (after 5 pm)

VIDEO GENIE £500 software £250 Tel 06632 3271

VIDEO GENIE 1 Nine months old, excellent condition plus books and software. £190 Tel 0452 34509

For sale

DRAGON 32, 2 months old as new £150 ono Tel 01 509 0200 (6 pm)

TEXAS TI99/4B all leads and manuals 1 month s/a £100 ono Tel (0634) 40818 evenings

SWAP VIC20 PIRATE COVE for The Count Voodoo Castle or Adventure Land Tel Dennis 01-850 4833

TI99/4A + plus extended Basic language cartridge + TI Invaders + Munchman + 2 games cassettes + cassette recording leads, 6 months old, worth £317 selling for £220 ono A Cetnik Northwood 22558

SHARP DUAL DISC DRIVE + printer suit M280K Others Tel 01 852 4836

ITT 20/20 48K + green monitor + single disc unit books etc £500 Tel Guedford 88585

UK101 8K Ram cased Segmen book one + four 300/600 baud software including Space Inn tool kit, + cassette recorder £75 Ferguson 12in black and white TV with above if required £30 Tel 061 852 7587

UK101 8K unused £100 Will swap for good printer or colour portable TV or monitor etc Tel 01-806 3032

SHARP MZ80A 48K Four months old + £100 software £325 Tel 01-594 5644 extension 257 Mr Sofer office hours

DRAGON 32, boxed as new + six games tape + books + dust cover £185 Tel 01-969 1257 after 6 pm

TEXAS TI99/4A + cassette leads + software Tel 01-674 0560

DRAGON 32 Three months old £150 ono (going to Middle East) Tel Blandford (0258) 51264 (anytime)

TEXAS INSTRUMENTS TI99/4A Cassette lead Invaders cartridge two other tapes £180 ono Tel 0366 840492 after 4 pm

SWAP complete legal home book C B including PSU extension speaker SWR extra leads books magazines, etc Wensee Best factory built ZX81 16K offered Tel Letchworth 4830 evenings

SELL OR SWAP Starship Chameleon cartridge Quest and Caitho Isavle cassettes for Dragon 32 Tel Bangor 678820 evenings

VIC20 CARTRIDGE, The Count — swap for any other VIC20 adventure cartridge Tel 01-464 5458

DRAGON 32 mint condition 2 months old + books £170 Tel 01-440 0900 after 4 pm

DRAGON 32 — Meteoroids £15 ono Tel 021-356 0286

THREE CARTRIDGES FOR SALE, Programme aid machine language monitor Vic 4TH £25 £25 and £20 respectively Tel 0282 814873

VIC20. Swap Pirate Cove + Wall Street for super expander + Swap Basic II + Super Worm for Maths and English Tel 0772 25386

VIC20 software for exchange or for sale Any offers Tel Chesham 786573

SHARP PC1211 + printer with manuals etc As new £85 Tel 01-868 0171

ZX81 CASSETTES — 80 £3 each Tel 01-868 8448

SWAP VIC20 Adventureland cartridge for The Count, Pirate Cove or Voodoo Castle Tel 0606-75557 (3 pm to 8 pm)

DRAGON 32 with joysticks one game 3 months old as new unused £180 ono Tel (0772) 793568 anytime

MICROTAN 65 + Tanex with Basic xa-bug assembler translator tele sound + Space Invaders on board keyboard keypad graphics + software included £200 ono Tel Coventry 449107

SHARP MZ80K, 48K 10 months old very good condition + Quantum high resolution graphics board cost £150 Fortran Forth Pascal + many game programs £310 ono Tel Kendal (0539) 27066 (evening)

ARCADE software for Basic Vic20 Rabbit Scramble £7 50 high tech car race £6 excellent games Tel Reading (0734) 64194

NINE CARTRIDGES for Intellivision £160 Tel (0536) 52971

TI 99/4A + TI Invaders + Munch Man + Texas games cassette + cassette recording lead 4 months old good condition £150 ono Tel S Acreman Ruislip 72103

TEXAS INSTRUMENTS KSR 473. Full Ascii keyboard + 80 column printer £240 + RS232 interface for Epson printer + 8K buffer £65 with 2K buffer £45 Tel 01-445 8013

SWAP VIC20 CARTRIDGES for tapes Tel 01-367 8751 6 30 pm to 10 pm

COMMODORE 16 RAM PACK for VIC20 unwanted gift sell for £35 Tel 061-430 7987

A 15/15 PRINTER, complete with paper hardly used as new £150 ono Tel 0274 570616 Mr Newbury 8 am to 5 pm

SHARP MZ80K, 48K dust cover manuals Basic plus Night Commander Fortran Forth Pascal Assembler numerous games £290 Tel 01-651 5405

UK101 16K RAM, loaded with SEK (23 formats) Cegmon X, Basic 5 6 amp psu 1/2 m Hertz 300 600 baud RS232 Printerface £130 ono Tel 0303 328421 office hours or 0303 341177 evenings

G7000 PHILIPS COMP GAME, 4 cartridges including PacMan + Freedom Fighters, one new £150 will swap Oric I or £75 Tel 01-471 5181

SWAPPING Meccano set for ZX81 P Rizzo 6 Herton Road Edmonton London N9 0SG

DUAL 8in FLOPPY DISC DRIVES, Sim Line cased psu OSOO offers or swap for BBC Tel 01-890 5131

STACK STOREBOARD with expansion system 3K memory + Vic Kit (not working) £30 + Vic slot cartridge £10 Vic machine monitor £20 Tel Horsham 60965 after 6 pm

SWAP BOXED MAD 3020 stereo amplifier for Spectrum or Atari Tel Bristol 646766

VIC20 CARTRIDGES to swap or sell £6 each + 40 cassette programs For information tel 01-574 4122.

ZX PRINTER PAPER 10 rolls, £18 Tel 01-445 4685 after 7 pm

APPLE II 48K Europlus brand new + Dyeransla + software worth £800 all for £700 Tel 01-402 5061 late evenings

WANTED ZX81 16K + printer Cash or swap for Olympus lenses enlarger etc Tel 0934 712344

VIC20 CARTRIDGES The Count, Adventure land £17 each Star Battle £13 Tel 0436 811634

SWAP VIC20 VOODOO CASTLE for other Adventure cartridge Tel 061 346 3874

VIC20 OMEGA RACE swap for Gorf + Alien swap for any other cartridge Tel Guisborough 34896

DRAGON 32 + joystick software £170 ono Tel Mr ris 01 979 2254

PRINTER COMMODORE 3022, tractor feed £180 ono Tel 07014 53279

SWAP Commodore 64 for 48K Apple II Tel eternal Hempstead 48141 evenings.

DRAGON 32 boxed as new with cassette lead + two joysticks two quality games and books £175 ono Tel 01 366 7080

INDUSTRY STANDARD 5¼in. floppy disc drives Tandon TM100/1 550 300K bytes per diskette new X equipment, £65 each Tel 01 701 6686

SWAP TWO DRAGON 32 CASSETTES Island Adventure and Forbidden City for Calixo Island or would consider any other Tel 0222 656 966 after 6 pm

SHARP MZ80A + manual + £90 software including Asteroids Pacman The Valley excellent condition £450 Tel 0202 812 841 evenings

DRAGON 32, £170 Upgrading Tel Scunthorpe 720631

JUPITER ACE 16K plus six programs £110 ono or swap for Spectrum 16K or 48K, cash adjustment Tel 01 727 9186

DRAGON 32, + bes, hardly used + be games leads books dust cover £188 ono Tel 01 599 1257 after 6 pm

SWAP PHILIPS PERSONAL HI-FI for Vic20 Super Expander cartridge Tel Ley Valley 9782274

DRAGON 32, sed weeks old + joy sack leads, + books + £120 software £250 Tel 041 334 0358

NEW BRAIN A cassette recorder beginners guide + tape + software £230 Tel Levent 01-567 4351 (after 6 pm)

HEWITT-PACKARD HP41C plus two Mem modules Maths and Stat App packs, card reader £300 or will split Tel 01 359 1068

DRAGON 32 with Ground Attack cartridge speech synthesis tape and Dragon Mountain Adventure £170 Tel Radakt 6346

NASCOM MICRO 19in rack/box 32K PSU cassette interface Lots of extras plus documentation £200 complete Also teletype 20mA current loop £30 ono Tel Chandlers Ford 63308

INTERTON VIDEO COLOUR COMPUTER including nine cartridges any offers Ring Peter 01 942 0808

TI-TEXAS 99/4A plus leads three cassettes hardly used £200 ono Tel 0274 560429

SHARP PC 1500 POCKET COMPUTER + C150 Printer Plotter LE152 cassette LE154 System brief case and CE155 8L Ram ex, £350 ono Tel 0526 316582

SINCLAIR 16K Ram Pack. Offers Tel 0273 688393 Also ZX Printer + nine rolls of paper Offers

DRAGON 32 new and boxed leads manual £165 Tel 021 553 2094

SPECTRUM MANUAL for ZX81 manual Tel 0273 688398

JUPITER ACE, complete with manuals leads, power supplies as new cost £90 sell £60 Tel 0366 21653

DRAGON 32, complete brand new boxed unused with colour graphics books + software including Quest Alcatraz, Flipper £185 Tel Wirral 051-653 5475 evenings.

PIMANIA C5 The Valley £6 and 3D Tank £2 50 + Spectral Invaders £6.50 Tel 01-346 0966 4 pm to 9 pm

ORIC 1, 48K brand new + cassette leads £180 Tel Luton 582834

MATTEL INTELLIVISION + 16 cartridges £200 Tel Upminster 21679

DRAGON 32, boxed + joysticks + cassette leads as new £180 Tel 0253 563664

SWAP CB OUTFIT including rig P S S R power meter etc. Consider any colour computer Tel 0702 335816

SUPER LANDER + Rat Race cartridge in exchange for programs old cartridge Tel 0482 75825

EXCHANGE your software with me Send SAE to M A Vaakland 101A Underdale Road Monkmoor Shrewsbury Shropshire SY2 5EF

SWAP my Aiwa personal cassette player for your Vic 3K super expander Tel Reading 302131

APPLE II EURO + £480 must sell perfect condition 48K Space Invaders Chess Might part exchange Tel 0273 508311

UK 101 cased 8K segmon + basic 5 software including assembler £70 Tel Walsall 0922 20640

DRAGON 32, with leads manual books and £85 worth of software Good condition, £240 Tel Ongar 363957 (Essex) evenings

SWAP SCISYS chess champion super system 3 memory pack, rechargeable battery pack, never used six months old for Spectrum or Vic20 or similar Tel 041 776 0881

COMPUTER BATTLESHIPS, £15 ono Tel Bexhill 221243 (6 pm)

8K CARTRIDGE for Vic20 Alien cartridge £10 Avenger cartridge £10 Tel Horsham 731106

SWAP THOMAS ELECTRIC ORGAN with all extras (cost new £600) for quality micro Prefer BBC or similar Tel (0323) 841716 evenings

SWAP VIC20 Voodoo Castle for any other adventure cartridge Not Pirate Cove Tel Sheffield 680453

SWAP (for other ZX Spectrum S/W) or sell Backgammon Scramble Invaders Super Draw Slow Loader Caterpillar etc Tel 0602 264851 evenings Richard.

5 ROLLS of ZX printer paper £8. Tel 0274 727095

MATTEL INT cartridge 3 £6 each For information tel Reth 834585

VIC AVENGER + Alien £10 each Tel 061 941 6904

16K Memotech Ram pack for ZX81, £20 inc Tel 0851 5239

NEW BRAIN AD, perfect condition, manuals plus leads £220 ono Tel 0954 50700 (after 5 pm)

DRAGON 32, 3 months old joysticks, tapes cassette leads £145 Tel 0803 311184 (Torquay)

BBC MODEL B, A also considered, exchange for hi-fi Linn-Sondek LP12 turntable + Hadcock G228 super arm + Decca, London cartridge vgc new £475 Tel 01-800 6726

Wanted

WANTED Commodore or Apple II Business System Tel 0925 810 184

SCHOOL NEEDS ZX80 for training Tel 01-836 0395

WANTED Commodore 8032 dual disc drive and printer Tel 0308 80543

WANTED BBC A/B or Apple II Tel Weybridge 53850 (6 pm)

WANTED COMMODORE PET 4032 also information on Sanders 804 terminal Tel 068 926446

BBC MODEL B + disc drive Tel 0992 552637

DRAGON 32, also software + joysticks Tel 01-863 4731



HOME-WORKERS

Kevin Kirkland of St Andrews Way, Church Aston Newport Salop writes

Q **A friend and I would like to start selling home computer software on a part-time basis Please could you advise me where we can get cassettes and labels produced as cheaply as possible?**

A. There are several companies dealing in tape duplicating at various levels I would suggest that you get in touch with the following three firms and ask them for quotes Bibi Magnetics Freepost London SW11 2BR Tape Duplicating Company 4-10 North Road Islington London N7 9HN Postern Limited PO Box 2 Andoversford Cheltenham Gloucestershire GL54 5FW

BIGGER AND BETTER?

R J Fon of Wishmore Cross School Alpha Road Chobham Surrey writes

Q **In this week's issue of *Popular Computing Weekly* (February 3-9) I see that the American version of the ZX81 is bigger than the UK version. Is the American printer compatible with our own version of the ZX81? If not, would it be difficult to modify?**

A The ZX Printer in America or rather the Timex 2040 is not greatly bigger than the one we know and love over here Its extra size is due mainly to the fact that it has a larger printer roll It does not have any more columns or lines

It should be compatible with our own original ZX81 The only other differences are that the lead is shielded because of American laws governing interference and that it is a true thermal printer whereas our version is electrostatic

KIDS FOR COURSES

Sandra Davies of Rickmansworth Hertfordshire writes

Q **I have heard that there are courses available to teach children about microcomputing I would like to know if you have any details of such courses — I was thinking of a residential holiday-type course, if possible based around the BBC model B micro I would be grateful for any information that you could offer**

A There are several courses that have made their appearance recently In all honesty, I do not know much about them I would suggest that you write to the following or telephone them for further details Angel Islington Centre 69 Upper Street, London N1 (01-359 2465) Director of the Summer School Worcester College of Higher Education Henwick Grove, Worcester (0905-428080) Computer Park 83 The Nook Back Lane Little Addington Kettering Northants NN14 4AY

The next two are Easter schools Micro Aid 25 Fore Street, Praze Camborne Cornwall (0209-831274) Octopus Oxford Computing Training Services St Josephs Hall Junction Road Oxford OX4 2UJ (0865 711829)

Lastly, for Sinclair owners the only dedicated course I know of are long weekends run by Gainsborough House Hotel, Bewdley Hill Kidderminster (0562-754041)

LOADED INFO

Andrew Creater of Macrae Street, Wick, Caithness writes

Q **I have a 64K Ram pack fitted to my ZX81, I would like to know how to *Load* data into the 8-16K area. Can you please suggest a routine to do this from within a program?**

A The easiest way to put information into this area is to *Poke* it A loop will be needed to read the data entered as a string

```
10 INPUT A$
20 FOR X = 1 TO LEN A$
30 POKE 8192 + X CODE A$ (X)
40 NEXT X
```

The number 8192, in line 30 is the first address in this 8-16K block, but you could use any other address in this block

As for *Saving* this information, you will have to *Save* the string and the bulk of the program separately First you will have to *Load* the string and the above program, to put the string safely into this area Then you can *Load* the main program

WILDCAT WONDER!

Grift Paterson of Trelane Road, Barry, South Glamorgan writes

Q **The Lynx seems to be a natural next choice after the ZX81 It has a real keyboard and Z80 processor**

Are there any plans for joysticks? How slow is the screen handling when compared with the Spectrum (surely any decent games will be in machine code anyway)? Also, I cannot understand why more fuss is not being made of the Lynx Is there a flaw?

A I would not say that the Lynx should be the automatic choice after a ZX81, though when compared to other computers in the same price range it does look to have a lot of potential I do not know if joysticks are planned at the moment, but I assume that some will become available quite soon

The screen handling in Basic is not as fast as it might be, however it should be able to match the Spectrum for speed And as you point out most decent games will contain at least some machine code

The Lynx does not have any obvious flaw I think that the reason for the lukewarm reception is that, like almost every other computer, it has arrived late While Computers clearly made a lot of effort to keep to deadlines, they did not succeed The computer press has quite understandably become somewhat jaded when it comes to delivery dates

Secondly the Lynx does not offer anything spectacularly new Instead it offers more of a balance between the best aspects of computer hardware Where else is there a 96K Ram colour computer for £300?

HELLO GOOD BUDDY

David Geddis of Newcastle upon Tyne, writes

Q **I have a Dragon 32 and I am very happy with it However, I have a problem that I think comes from a Citizens band radio Sometimes, usually early evening, I seem to get a lot of crackle over the speaker if I am using my Dragon. It is not very loud, but if I am using sound it will definitely interfere with it.**

Is it possible for a CB to do this to my computer and, if so, what can I do about it?

A It is possible but highly improbable It is also against the law as the CB would have to be working on an illegal frequency, to cause such interference I would advise you to go to the post office and ask for a Radio Interference form Fill this in and they will arrange to monitor or test for interference

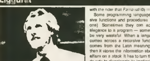
Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF

Top 10

Books

1	(1)	Enter the Dragon *Carter*	(Melbourne House)
2	(2)	Assembly Language Programming for the BBC Micro *Birnbaum*	(Macmillan)
3	(5)	Spectrum Machine Language for the Absolute Beginner *Tang*	(Melbourne House)
4	(3)	The Working Dragon 32 *Lawrence*	(Sunshine)
5	(4)	Computel's First Book of Vic, various	(Compute!)
6	(8)	Creative Graphics on the BBC Micro *Cownie*	(Acornsoft)
7	(9)	The Complete Forth *Winfield*	(Sigma)
8	(—)	Z80 Assembly Language Programming, *Leventhal*	(Osborne)
9	(6)	Vic Programmers Reference Guide *Finkel*	(Commodore)
10	(—)	Forty Best Machine-code Routines for the ZX Spectrum, *Hardman*	(Hewson)

(Figures compiled by Watford Technical Books, Watford 0923 23[illegible])
(Last week's figures in brackets)



Cracking eggs with sledgehammers

You have probably heard of the "Liar Paradox" (see Eugene P Northrop *Riddles in Mathematics* Penguin Books for an admirable discussion — especially the chapter on "Paradoxes in Logic")

For those who have not its essence is simple There is a statement which we can call *E* and the content of *E* is *E* the statement named *E* is false

If *E* is true then *E* is false if *E* is false then *E* must be true — and so the spiral goes on What we have here is an example of a self-referential statement (ie a statement which can refer to itself) By approaching from two different directions (it is true or it is false) we reach two inconsistent results

Self-reference is given another name in computing it is called "Recursion" A definition of recursion might take the form — *Recursion* see recursion

The easiest example to give is the factorial function. The factorial of the number *N* is equal to all the numbers from 1 to *N* multiplied together The factorial of 4 is thus 1 × 2 × 3 × 4 = 24 But as is easily seen the factorial of 4 is 4 times the factorial of 3 (which is 1 × 2 × 3 = 6)

A recursive definition of the factorial function is thus *Factorial (N) = N * Factorial (N − 1)* with the rider that *Factorial (0) = 1*

Some programming languages allow recursive functions and procedures (BBC Basic is one) Sometimes they can add a touch of elegance to a program — sometimes they can be very wasteful When a language translator comes across a recursive function (*recursive* comes from the Latin meaning to run again) then it stores the information about the state of affairs on a *stack* It has to turn the definition on its side to disentangle its implications

As Forth is a stack-using language I will use Forth to show what happens (Ace Forth and Atom Forth)

On the Jupiter Ace if I want to write a recursive definition for a factorial function I follow the recursive scheme above and within my definition of the factorial I use the name of the factorial *Fact ?Dup If Dup 1− Fact * Else 1 Then* and though you might not be able to program in Ace Forth you can that *Fact* is defined and uses itself later.

The word *Fact* checks to see if the number on the stack is non zero and duplicates the number (*?Dup*) *If* it is non-zero the number on top of the stack is decremented by 1 (1−) and *Fact* is reactivated *Else* the number one is left on the stack, and the nested *Facts* unwind This will work on the Ace but not on the Atom because, on the Atom a dictionary entry (ie *Fact*) cannot find itself while it is being defined (Also, trying this with ZXForth from Artic is a good way of crashing the system)

To calculate the factorial by use of recursion on the Atom you have to define a special word *Recursive Latest Pfa Cfa* , *Immediate* which says to the system take the very latest definition and put it *here* (which is what the *Immediate* means) To perform a recursive definition of *Fact* we insert the word *Recursive* for *Fact* in the main body of the definition

I am always impressed by recursive definitions they seem like sledge hammers to crack eggs at times

Puzzle

A pair of squares

Puzzle No 47

Professor Hex the well-known mathematician was reading a lengthy volume on *The Theory of Interspatial Relationships* when he noticed something special about the page numbers he was on The book was open at pages 328 and 329 He saw that if he joined the two numbers together the result — 328329 — was a perfect square (573^2)

As the book had one thousand pages Professor Hex wondered if there were any other pairs of pages with the same curious property Are there any — and if so which are they?

Solution to Puzzle No 42

Jamie only remembered enough of the question to get the correct answer — if he had been asked the question he would have been stuck!

```
10 FOR A = 2 TO 8 STEP 2 20 FOR B = 0 TO 8
STEP 2 30 FOR C = 2 TO 8 STEP 2 40 FOR D = 0
TO 8 STEP 2 50 FOR E = 0 TO 8 STEP 2 60 LET T
= (A*10+B)*(C*10+D) + E 70 LET T$ = STR$ T 80
IF LEN T$ <> 4 THEN GOTO 100 90 IF T$(1) =
T$(2) AND T$(1) = T$(3) AND T$(1) = T$(4) THEN
PRINT A;B;" * ";C;D;" + ";E;" = ";T$ 100 NEXT E
110 NEXT D 120 NEXT C 130 NEXT B 140 NEXT A
```

The program tests all the possibilites where the numbers on the left hand side of the equals sign are all even (counting zero as even) and the third left-hand term is added The plus sign at the end of Line 60 (and in Line 90) should be changed to a minus to test possibilities where the third term on the left is subtracted This procedure should then be repeated for odd numbers by changing Lines 10 to 50 in each case replacing 2 to 8 Step 2 by 1 to 9 Step 2

This gives the answers 39 x 57 − 1 = 2222 and 57 x 39 − 1 = 2222

There are other results where the *terms* on the left-hand side are either all odd or all even but these two are the only ones where all the *digits* on the left are either all odd or all even

Winner of Puzzle No 42

The winner is Jim McBain Meikle Earnock Road Hamilton Mid Lothian who receives £10

Top 10

Atari

1	(—)	Defender	(Atari)
2	(—)	Fort Apocalypse	(Synapse)†
3	(1)	Miner 2049er	(Big Five)*
4	(—)	Legionnaire	(Avalon Hill)
5	(4)	Preppie	(Adventure International)
6	(—)	Galaxians	(Atari)*
7	(6)	Soccer	(Thorn EMI)†
8	(2)	Hell Cat Ace	(Microprose)
9	(—)	Star Raiders	(Atari)*
10	(—)	Wizard of Wor	(Roklan)

*Cartridge. †32K cassette

(Figures compiled by Calisto Computers Birmingham 021-632 6458)

Spectrum

1	(2)	Penetrator	(Melbourne House)
2	(4)	Time Data	(Quicksilva)
3	(3)	3D Tanx	(DK Tronics)
4	(9)	Ah Diddums	(Imagine)
5	(—)	Scramble	(Mikrogen)
6	(—)	Froggie	(A & F)
7	(3)	Maze Crystal	(Carnel)
8	(—)	Master File	(Campbell Systems)
9	(—)	Vu-3D	(Psion)*
10	(1)	Model	(Melbourne House)*

*Requires 48K.

(Figures compiled by Buffer Maze Shop, London 01 769 2887)

ZX81

1	(2)	Maze Crystal	(Carnel)
2	(—)	Gulp II	(Campbell Systems)
3	(1)	Flight Simulation	(Psion)
4	(—)	Sea Wa	(Panda)
5	(—)	3D Defender	(JK Greye)
6	(8)	Kong/Dracula	(Tony Roberts)
7	(9)	3D Monster Maze	(JK Greye)
8	(—)	Tikas	(Pixel)
9	(—)	Galaxians	(Artic)
10	(10)	Fantastic Voyage	(Fellsoft)

All 16K

(Figures compiled by Buffer Maze Shop, London 01 769 2887)

BBC*

1	(1)	Rocket Raid	(Acornsoft)
2	(—)	Arcadians	(Acornsoft)
3	(—)	Planetoids	(Acornsoft)
4	(3)	Colossal Adventure	(Level 9)
5	(—)	Castle of Riddles	(Acornsoft)
6	(8)	Early Learning	(BBC Soft)†
7	(5)	Philosophers Quest	(Acornsoft)
8	(4)	Chess	(Program Power)
9	(—)	Snapper	(Acornsoft)
10	(—)	Laser Command	(Program Power)

*All Model B only except where marked.
†Both Model A and B

(Figures compiled by Mean Management, Ipswich 0473 58181)

Dragon

1	(2)	Model Invasion	(Microdeal)
2	(1)	Dragon Trek	(Salamander)
3	(4)	Asemnon	(Microdeal)
4	(5)	Invaders Revenge	(Microdeal)
5	(3)	Ghost Attack	(Dragon Data)
6	(8)	Alcatraz II	(Microdeal)
7	(—)	Space Maze	(Compusense)
8	(8)	Fun and Games	(Wizards)
9	(—)	Ravenball	(Microdeal)
10	(10)	Games Tape 4	(Asemnon Micros)

*Cartridge

(Figures compiled by Dragon Dungeon Ashbourne 0335 44626)

Vic20

1	(1)	Grid Runner	(Llamasoft)
2	(7)	Abductor	(Llamasoft)
3	(—)	Frog	(Microdean Micros)
4	(—)	Sargon II Chess	(Commodore)
5	(2)	Andes Attack	(Llamasoft)†
6	(8)	Arcadia	(Imagine)
7	(4)	Quackers	(Rabbit)
8	(10)	Gorf	(Commodore)
9	(—)	Multisound Synthesiser	(Rymes)
10	(—)	Traxx	(Llamasoft)†

*Cartridge †Requires 3K or 16K.

(Figures compiled by Vic Centre London 01-992 9064)

